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USSR Report

AGRICULTURE

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19 March 1986

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MAJOR CROP PROGRESS AND WEATHER REPORTING

FIELD WORK PROGRESS FOR 1986 CROP

Fall Field Operations

Moscow SELSKAYA ZHIZN in Russian 20 Sep 85 p 1

[Lead article: "Speed Up Fall Plowing"]

[Text] Increasingly more frequently the golden hue of the stubble on the fields is changing into the dark color of plowland. Fall plowing is the guarantee of the coming harvest. Remembering this, farmers are striving to fulfill all requirements made for basic cultivation of the soil and put the plow in the furrow in the wake of the combine.

The role of fall plowing is difficult to overestimate. According to data of scientific institutions of the Central Chernozem Belt, after 15 years of 4-field crop rotation, removal of stubble followed by plowing reduces the weediness of sowings tenfold. Fall plowing improves the soil's water and air conditions, helps to fight pests and diseases of cultivated crops. The cultivation of fields beginning in autumn also makes it possible to significantly reduce the intensiveness of spring operations when time is counted by the hour.

A difficult situation has now come about in preparation for an early, and most valuable, fall plowing because of late maturing of grain crops. Under such conditions, the desire is great to take in full the grown crop. But nonetheless it is important to concern oneself with the next harvest. Such an approach to basic cultivation of the soil today distinguishes the work of many machine operators of Chuvashia, where plowing is now in progress on the last quarter of the area intended for sowing of spring crops. The work of units is organized into two shifts and only by the group method. Measures of moral and material stimulation were introduced for highly productive labor and added pay for fulfillment of daily targets. And the tempo is growing.

Examples comparable to this are also to be found in other zones. Thus, Kuybyshev farmers fall-plowed 1.3 million hectares, Bashkirian--almost 2 million hectares. In the Far East, farms are ahead in Amur Oblast and in the Central Chernozem Belt--Tambov Oblast. One can get a picture of how the work is organized here on visiting Rodina Kolkhoz in Michurinskiy Rayon. On its fields, anywhere from 10 to 12 units are to be found. In one day they plow up

to 160 hectares of area. A fast rate is not to the detriment of quality. Before the tractors with plows go on the field, stubble is removed, fertilizers applied and plowing is done with coulters to a given depth.

While given the best collectives their due, at the same time it is necessary to acknowledge that, as they say, weather is not made on the whole. The plowing tempo is significantly below last year's level. In addition this gap continues to grow. While one-third of the planned areas have been fall plowed, we are on the threshold of autumn cold and bad weather. Actually, the important work is only beginning in the Northwestern Zone and in many oblasts of the Central Region. Thus in Bryansk Oblast, harvesting of grain crops is coming to an end, but the fields are littered with heaps of straw. At the same time in Ryazan Oblast, plowing has been completed on more than one-half of the areas allotted to spring crops. Local organs of the agroindustrial complex must adopt all the measures to sharply speed up the rate of fall plowing. It must not be forgotten that late fall plowing is equated with spring plowing in terms of agrotechnical properties.

The existing situation demands that the soil be worked day and night, using for this the duty shift method, providing the teams with two shifts of machine operators. On each farm special detachments are needed for first fall plowing, provision with tractors that are free of other fall work and, first of all, are power provided. And how important it is to establish progressive pay depending on plowing quality! It is necessary to direct attention to this side of the work again and again because on many farms organic and mineral fertilizers are not applied to the fields in the fall and no liming or application of gypsum are carried out although the fall season is the best in the year for performing such work. Many zones require removal of stubble without fail and the use of coulters. Only in this way is it possible to guarantee a big harvest of spring crops in the new year naturally, a differentiated approach is required in each natural zone for basic tilling. Each has its own fall-plowing complex verified by the practice of many years. In many oblasts of the Ukraine, for example, so-called semifallow tillage has well proved itself. On Nonchernozem Zone fields, plowing, especially for row crops, is frequently combined with deepening of the plowing layer. A unique complex of fall operations has been formed on fields where spring crops will be cultivated according to intensive technology. The direction of tillage is of major importance. Its annual alternation levels out the fields, which in turn promotes highly productive use of equipment.

Finally, it is necessary to direct attention to methods preserving the soil from water and wind erosion and helping plants to deal with drought. We refer to slotting [shchelevaniye] of the fall field, creating on it different kinds of microlagoons [mikrolimany] and depressions [uglubliniya] and contour plowing. In Western Siberia, in north Kazakhstan, in the forest-steppe and steppe Ukraine and in the North Caucasus, moldboardless, especially subsurface, cultivation is gaining increasing priority. Last year it was carried out on 43 million hectares. No less a volume of work is to be done this year. For this reason it will be necessary to use the entire park of subsurface cultivation tools.

Invaluable assistance in their restoration and repair is bound to be given by enterprises of Selkhoztekhnika and local industry, setting up first of all the manufacture of plowshares for deep rippers. It is necessary to resort to their assistance because machine builders are only half satisfying farms' needs for these plowshares, and their quality is low.

In the fall, machine operators will be right in bringing to strict account personnel of cultural and personal services. A warm van, in which one can rest in bad weather, and hot food, and new newspapers and magazines--all this should be in field camps. Farm heads and party organizations must not forget for a minute that the success of the work is determined in the final analysis by people. They will finish earlier and better all the operations of the fall-plowing complex, and the harvest of the first year of the new five-year plan will be substantial.

Winter Preparations for Spring

Moscow SELSKAYA ZHIZN in Russian 18 Jan 86 p 1

[Lead article: "A Winter Day for the Harvest"]

The first spring of the new 12th Five-Year Plan is drawing near. But a little while will pass and farmers in the country's southern regions, taking advantage of "weather windows" will carry out reconnaissance aggressively--they will begin the sowing of early spring crops.

Incidentally, today's winter day in the countryside does not resemble the old, traditional in-between season time when the grain grower found himself in a period of thought and repose. On kolkhozes and sovkhoes and at all enterprises of agroprom, unceasing work is in full swing even in the winter. A special creative mood for the many-sided affairs of farmers and their partners is lent by the circumstance that they are emerging into spring which can with confidence be called historical.

For the first time all links of the country's vast agroindustrial complex are lining up for a unified, strong aim to undertake together a new offensive for the fulfillment of the food program and for fuller satisfaction of the needs of the population for food products and of industry, for agricultural raw materials. The USSR State Agroindustrial Committee, created by a decision of the party and the government, is concentrating in the same hands the planning, financing and administration of all subdivisions of the agroindustrial complex. It is a matter of honor for communists and workers of agroprom complex at all levels to systematically and determinedly carry out what has been designated.

In precongress party documents, major tasks have been assigned to the country's farmers. They must sharply increase yields of grain, vegetables, fruit, industrial and fodder crops. It will be necessary to produce additionally this year solely through the use of intensive technologies no less than 26 million tons of grain. Almost half of intensive sowings--14 million hectares of winter wheat and rye--have been behind us since fall. On

most farms they were sown with high-class seeds on the best predecessors and were given optimal doses of fertilizers.

As the USSR Hydrometeorological Scientific-Research Center reports, the state of winter crops is basically satisfactory. In the Crimean, Kherson and Rostov oblasts, in Krasnodar and Stavropol krais and in Azerbaijan and the republics of Central Asia, they have revived the vegetative stage. Unfortunately, in Volga-Vyatsk, the Ural and in the north of the Volga and Central regions conditions were created hurting winter crops with rotting and in Belorussia, a number of regions in the Ukraine, the Central Chernozem region, the Volga region and several others, as a result of thaws, they are being hurt by being kept close to the soil by a crust of ice. These circumstances demand maximum attention of agronomists in their observations of the state of winter crops. At the same time, effective and skilled analysis should be accompanied by early preparation of farms for repair work and possible resowing of winter crops.

A new step on the way to broader introduction of intensive and industrial technologies is to be made in the spring-crop fields of the country. Analyzing the work experience of the past five-year plan, it is necessary in the remaining prespring days to critically evaluate disclosed defects and to do everything possible so that they are not repeated. It is no secret that on some farms even of such a developed farming region as Krasnodar Kray, they have decided to introduce intensive and industrial technologies, in the picturesque expression of the well-known field master M.I. Klepikov, a "cavalry attack with old resources of knowledge."

No, the new state of affairs requires new resources of knowledge, which should be mastered by specialists and personnel of all levels. To be concerned with this is a pressing task of agronomists and rayon agroindustrial associations. A good example in this regard is provided by many oblasts of the RSFSR, Ukraine, Belorussia and North Kazakhstan. Schools of leading experience, seminars and courses--all forms of instruction must be utilized for developing concrete plans of action at specific farms, brigades and links and at specific fields.

The approach of spring increases the responsibility of agronomists, farm heads and rayon agroindustrial associations, and oblast and republic agroindustrial committees for quality preparation of seed funds. This is all the more important because everything here is far from in order. Take, for example, the existence of seeds at kolkhozes, sovkhoses and interfarm enterprises of the Russian Federation. According to data of the RSFSR Central Statistical Administration, as of 1 January the republic as a whole had 91.9 percent of potato seed tubers, 88.8 percent of legume seeds, 83.8 percent of perennial grasses and 81.6 of buckwheat. An alarming situation has been created for sunflower seeds--only 24.2 percent of the required amount were available.

The present year is to be made into a breakthrough year in the production of fodder protein. This problem needs to be solved more actively than in the past, and along many directions. The main thing should be a sharp expansion of sowings and a rise in the yield of legume perennial grasses--clover, alfalfa, sweetclover, sainfoin and an increase in the plantings of rape,

soybeans, beans, lupine and other protein crops. Here questions of seed growing await their basic solution at a most modern level. In this connection, the role is growing of specialized seed-growing farms, scientific-production associations, experimental stations and scientific-research institutions. A great deal can also be done by agronomists themselves by expansion of experimental work. Moreover, it is necessary to prepare for such an important matter even now.

As of now, the situation in regard to seed funds of protein crops cannot but help concern one. Thus, for example, the needs of Leningrad, Novogorod, Bryansk, Kostroma, Kalinin, Smolensk, Yaroslavl and a number of other oblasts of the Nonchernozem Zone in regard to seeds of leguminous crops are satisfactory only in the amount of 25-33 percent. Even farms of Orel Oblast, where the All-Union Scientific-Research Institute of Legume and Cereal Crops with their principal support bases are located, are provided with seeds of legumes and buckwheat only in the amount of 76-77 percent, and these possess low sowing qualities.

In a word, managers and specialists of agroindustrial committees, rayon agroindustrial associations and farms are called upon in the concluding stage of sowing preparations to adopt energetic measures so as to create everywhere a sufficiency of all types of high-quality seeds. There where the possibility exists it is necessary to organize rapid interfarm, interr rayon and interoblast exchange and without dawdling to select requisition stocks from state resources.

"A winter day for the harvest"--this slogan has been adopted of late by many farmers' partners. Particularly desirable in the winter season is active work by subdivisions of Selkhozkhimiya and reclamation specialists. First of all, the task set in the draft of Basic Directions needs to be solved competently and energetically--to bring up in the next 5 years the yearly use of organic fertilizers to 1.5 billion tons.

These days the editorial office is receiving reports on shock months concerned with the shipment of organic matter to many of the country's regions. But together with them, alarming warnings are being issued--here and there manure is being brought to the fields without being composted, organic matter is scattered in small clumps and it is applied incompetently and carelessly. Such "simplifications" of an important operation hardly allow one to expect the necessary effect, and such practice should be barred everywhere.

Many land-reclamation organizations have embarked confidently on the new 5-year plan these winter days. In the south, they are helping to complete cleaning of canals and irrigation canals, leaching of salinated land and to expand irrigation areas. In the north, a campaign has been started for the creation of amalgamated fields in the place of bogs, sparse woods and various inconveniences. A good example in this regard is shown by Psokov reclamation specialists. Uniting the work force and equipment with local kolkhozes and sovkhoses, they created more than 50 detachments of the association which are engaged in cultural-and-technical and land-reclamation work in tens of farms in the oblast. Decisively breaking departmental barriers, they work for a single purpose--for the harvest of the new 5-year plan.

Spring is drawing ever closer, its life-giving breath is increasingly more distinct. Meeting it well-prepared constitutes a first-priority task for farmers, all agroprom workers and rural party organizations. Each winter day for the harvest!

7697

CSO: 1824/200

MAJOR CROP PROGRESS AND WEATHER REPORTING

SEED PREPARATION WORK FOR SPRING SOWING

Moscow SELSKAYA ZHIZN in Russian 3 Dec 85 p 1

/Lead article: "Seed for the Spring Fields"/

/Text/ Workers attached to the country's agroindustrial complex are making preparations for the 27th CPSU Congress. A competition has been launched on an extensive scale in all areas aimed at ensuring the organized carrying out of agricultural operations, increasing the procurements of products and raw materials and creating the conditions required for a successful start during the first year of the 12th Five-Year Plan. In discussing the party's pre-congress documents, the APK /agroindustrial complex/ collectives are fully resolved to carry out the plans as outlined and to make a worthy contribution towards carrying out the tasks of the Food Program.

In order to achieve considerable growth in cropping power and in the gross yields for grain and other crops, as set forth in the Basic Directions for the Country's Economic and Social Development during the coming years, it will be necessary to make full use of all of the factors concerned with the intensification of farming production. Among these factors, an important place is occupied by seed production. Experience reveals that those farms which sow their fields using first class varietal seed and which observe all of the agronomic and technological requirements as a rule obtain fine yields each year and are able to cope with the plans for selling agricultural products to the state.

Farms in Ilishevskiy and Dyurtyulinskiy rayons in the Bashkir ASSR are distinguished by stable farming production operations. This year they obtained 29-31 quintals of grain per hectare here and they overfulfilled their five-year plans for procurements. This was promoted by the use of intensive technologies and efficiently organized seed production operations. In Omsk Oblast, fine work was performed by the collective of the Elita Sovkhoz, where 28.5 quintals of grain per hectare were obtained. The best results were obtained from fields which were sown with the new varieties of spring wheat: Omskaya-9, Omskaya-17 and Irtysanka. The growth realized in yields on leading farms in Cherkassy, Orenburg and Lipetsk oblasts and in Krasnodar and Altay krays was largely due to the use of high quality seed.

Seed work can and must be organized in a high quality manner in all areas. This year the quantities of grain and pulse crop seed placed in storage were on

the average somewhat greater than the amounts called for in the plan. Many kolkhozes and sovkhoses throughout the country succeeded in coping with this work. At the same time, some farms in Uzbekistan, Kirghizia and the nonchernozem zone of the RSFSR, owing to poor organization, sluggishness and at times complicated weather conditions, were unable to satisfy completely their requirements for high quality seed. During the year's final stage, the leaders and specialists of kolkhozes, sovkhoses, RAPO's /rayon agroindustrial associations/ and party organizations must undertake energetic measures aimed at ensuring that sufficient quantities of all types of seed are made available in all areas for the spring sowing work.

However, the concern of the farmers with regard to their seed funds is not limited only to the quantities placed in storage. A chief concern is to ensure that the seed has viable power and is in high quality condition, thus making it possible to achieve high yields per hectare. This work is far from completed. By the middle of November, 84 percent of the seed supplies checked throughout the country had been improved to sowing condition. Much is being accomplished in this regard in Belgorod Oblast. Here all of the spring crop seed has been quality standardized and 80 percent has been improved to 1st class quality. This results from the fact that this important work is being carried out by specialized teams which operate on the basis of collective contracts. Even back during the harvest period, an effective competition for the creation of high quality seed funds was launched among the farms and rayons. Many leading farms in oblasts in the central chernozem region, the Ukraine and Belorussia are successfully improving their seed to the required conditions.

The preparation of seed for the future fields is considered to be an urgent task of the winter agrotechnical complex of operations. It must be carried out in a timely and high quality manner in all areas. Unfortunately, this requirement is being overlooked in some areas. The spring crop fields in Kazakhstan are vast. For sowing purposes, more than 3 million tons of grain crop seed have been placed in storage here. But less than one half of this amount has been improved to the proper condition. In particular, the farms in North Kazakhstan, Pavlodar and Kokchetav oblasts have fallen behind; here only one fourth of the seed has been prepared for sowing. The republic's kolkhozes and sovkhoses have adequate quantities of technical equipment at their disposal for cleaning, drying and sorting the grain. However, a check has revealed that full use is not being made of this equipment.

Similar facts have been uncovered in Novosibirsk, Kurgan and Novgorod oblasts. On many farms, the capabilities of the post-harvest grain processing points are being utilized only 30-40 percent and some are completely idle. Only an extremely small amount of first class seed has been prepared in these oblasts -- only 5-7 percent of the quantity checked. The interests of the future harvest require the immediate removal of these shortcomings and the rapid completion of the seed funds prior to the onset of strong frosts. Importance is attached to ensuring efficient operation of the grain-cleaning and drying machines, interesting the machine operators in achieving high final results and to raising the responsibility of the agronomists for the quality and preservation of the seed supplies.

A considerable amount of attention must be given to the creation of high quality seed funds for durum and strong wheat and groat and pulse crops. An

urgent need for such seed is being felt on many farms and yet despite this fact measures are still not being undertaken in all areas aimed at raising the seed quality. In Orel and Tula oblasts, for example, 70 percent of the buckwheat seed is not quality-standardized and in Ryazan and Chelyabinsk oblasts -- 80 percent of the millet. Importance is being attached to raising to 1st class condition the seed for sunflowers, sugar beets, rape, flax, vegetables and perennial grasses. In those areas where the possibility exists for doing so, an inter-farm exchange should be organized in the interest of ensuring that each kolkhoz and sovkhoz has an adequate supply of spring crop seed available. Special control must be exercised over the potato seed funds. A complicated situation has developed in some regions with regard to maintaining these funds. Thus considerable importance is being attached to protecting all of the tubers against spoilage and to preserving them well until spring.

Seed quite properly is referred to as the gold fund for the harvest. It must be prepared in a reliable manner for the spring sowing -- in this manner an important step will have been taken along the path to farming intensification and to carrying out the country's Food Program.

7026

CSO: 1824/194

MAJOR CROP PROGRESS AND WEATHER REPORTING

SEED PROCESSING TECHNIQUES IN ORENBURG OBLAST REVIEWED

Moscow SELSKAYA ZHIZN in Russian 29 Dec 85 p 1

/Article/ by V. Beglov, chief of the Department of Grain Production and Other Farming Problems of the Orenburg Oblast Executive Committee, Orenburg Oblast: "First Class Seed"/

/Text/ Snow is falling in Orenburg Oblast with a white blanket covering the fields. This pleases the farmers, since it means that there will be more moisture in the spring. However, the grain growers are not standing idle. Their chief concern at the present time is the seed.

In previous years, the farms committed serious mistakes in carrying out their work with the gold fund of the harvest. A portion of their seed was imported and thus seed of unknown reproductions and at times of non-regionalized varieties was placed in the soil. This year the situation has changed noticeably for the better.

The logistical base for seed production became stronger during the 11th Five-Year Plan. The Yuzhnyy Ural Scientific Production Association, which is engaged in primary seed production for grain crops and in growing and selling "Elite" class seed at 35 seed production farms throughout the oblast, was created and is now undergoing expansion. In turn, these latter farms supply the seed-growing brigades and departments of kolkhozes and sovkhoses with grain of second and third reproductions.

Powerful cleaning and drying complexes have been built at a majority of the semkhoses /seed farms/. A portion of the mechanized threshing floors on the farms have been rebuilt. Scientists, practical workers and efficiency experts furnished assistance in carrying out this work. Thus the collective of the Mechanization Department at the Orenburg Agricultural Institute developed a design for a pneumatic separator which employs the principle of a differentiated effect of a current of air on different groupings of seed. The machine effectively separates out puny grain and grain damaged by stink-bugs and other pests. This year alone, the local enterprises of Selkhoztekhnika produced 300 pneumatic separators, all of which have already been placed in operation. As a result, labor productivity in the preparation of seed has increased considerably.

A great amount of work was carried out this past summer. Prior to the commencement of the harvest work, the executive committee of the oblast council

assigned the task not only of placing in storage the full amount of seed required prior to 1 October, but also of raising the quality of the seed to a high sowing condition. Seminars were conducted in each rayon for the agronomists and engineering-technical workers and directly on the farms -- exercises with combine operators, during which discussions were held on the harvesting of seed fields and on the highly productive use of grain-cleaning equipment. Successful work was promoted by special measures for issuing material incentives to those individuals responsible for the fate of the harvest's golden fund.

An important campaign was carried out in a highly responsible manner in Belyayevskiy and Kuvandykskiy rayons. Here, commencing with the very first days of the busy harvest period, grain cleaning work was carried out at a high tempo, exchange operations were carried out and seed was obtained from the Yuzhnyy Ural Scientific Production Association. At the present time, all of the seed in these rayons is of first quality only.

Fine work was performed by the agronomic services and farmers in Novosergiyevskiy, Perevolotskiy, Grachevskiy and some other rayons, where 96-99 percent of the seed fund was improved to first class condition.

Compared to the overall supply of seed, the proportion of first class seed throughout the oblast as a whole is only 77 percent. However, seed exchange work is being carried out at the present time and assistance is being furnished to those who lack high quality-standardized grain.

The Orenburg agronomists attach special importance to the disinfection of grain. The seed for such crops as barley and oats has for the most part already been chemically disinfected and the treatment of wheat seed is now commencing. A considerable portion of this seed will be subjected to incrustation using various adhesives. Unfortunately, there are not enough machines available for carrying out this work.

The varietal structure of the seed is also changing somewhat. The proportion of durum wheats is increasing. Moreover, the sowings of the locally bred Orenburgskaya-2 variety will be expanded simultaneously with the Kharkovskaya-46 variety. A preference has been shown for wheats having high quality grain -- the strong varieties Saratovskaya-29 and Saratovskaya-46.

The strengthening of the agronomic service for kolkhozes and sovkhoses produced changes for the better. For example, the raysemkhozes [rayon seed farms/ imeni K. Marks in Buzulukskiy and imeni Lenin in Kurmanayevskiy rayons are performing in a stable manner as they fulfill their plans for the production and sale of seed. Fine work was performed in this regard by agronomists S. Bochkarev and V. Gronkin. Many such examples could be cited.

At the same time, we must not overlook the fact that as a result of our dry conditions the percentage of grain damaged during threshing and cleaning is great. There is obviously an immediate need for organizing the production of detachable rubber beater plates for threshing drums, which are needed out on the millet, buckwheat and pulse crop fields. There is also a strong requirement for a wide-swath harvester. In the absence of such a unit, it is difficult out on

the steppe expands to form a normal wind-row thickness (doubling up does not help) and also without it there will be grain and ear losses and damage to the grain.

The all-round stations for processing seed (the Rostov variant) are drawing criticism. They have only one line, the seed flow is raised repeatedly by the bucket chain and this again causes damage to the seed. A shaft dryer is not very productive. Moreover, owing to unstable temperatures it often lowers the germination capacity of the seed. A mechanical mixing of crops and varieties is almost inevitable when converting over to cleaning a new batch of grain. And indeed the seed production volumes are increasing.

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PLANT PEST FORECAST FOR 1986

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/Text/ In the spring of 1985, in the northern, western and central regions of the European part of the USSR, unstable rainy weather delayed the commencement of field operations and late frosts suppressed the development of all crops. Hot dry weather characterized by frequent dry winds predominated in the southern and southeastern oblasts. This created unfavorable conditions for the development of the crops in a number of areas. In the cotton growing regions, cold weather returned during the spring thus delaying the sowing schedules for cotton and even raising the need for resowings in some areas. In Siberia and Kazakhstan, following a warm period which started plant growth, a severe cold snap took place accompanied by a covering of snow. The development of pests and diseases was delayed almost in all areas and the propagation levels for the grain moth, fleas, locusts and mice-like rodents declined.

The beginning of summer in the European portion of the USSR was cool and sufficiently damp. A deficit of moisture in the soil was noted only in the southern, southeastern and central regions and in the Urals. The second half of the summer was hot and marked by periodic showers. This improved conditions for the development of row crops, but the periods for their ripening were delayed and this resulted in late harvesting of the crops.

Summer was cool and damp in a majority of the oblasts in Siberia and Kazakhstan and the formation of the harvest for all crops took place under conditions considered to be close to optimum. Crops were suppressed owing to dry weather conditions only in certain areas of western Siberia and western Kazakhstan. Summer was hot in the cotton growing regions. The appearance of damage caused by a majority of the dangerous insects and phytopathogens was delayed. However, owing to a lowered compensatory potential on the part of the plants, protective treatments had to be carried out at the lowest economic threshold for damage.

The weather conditions throughout the growing season promoted the development of a number of diseases common to grain, fruit and vegetable crops, potatoes and

grapevines. Frequent rainfall in a number of regions washed away the fungicides and this brought about an increase in the frequency of treatments.

Polyphagous Pests

Susliks. The centers for damage caused by this pest continue to be found in Volgograd, Rostov, Kemerovo, Uralsk and Aktyubinsk oblasts and in the Altay and Krasnoyarsk krais. The intensity of propagation by these small wild animals was high in almost all areas. The conditions for their fattening, especially the young ones, were unfavorable in the European portion of the USSR and in western Kazakhstan and this resulted in a lower intensity of propagation for the coming year. The volume of extermination treatments should be continued at the level for last year, with one half of them being carried out using the mechanical method.

Mouse-like rodents. As a result of poor conditions during the winter and spring of last year, a phase of depression developed in the European portion of the USSR. Thus an accurate forecast contained a recommendation for reducing the planned volume of protective treatments. The cold and delayed spring period delayed the propagation of the mouse-like rodents. Abundant rainfall during the summer in the nonchernozem zone of the RSFSR and hot dry weather in the central chernozem zone, the Volga region and in the steppe regions of the north Caucasus and the Ukraine suppressed the development of field mice and other mice. By autumn, no increase was observed in their numbers. Individual centers having raised numbers of the rodents were observed only in the western and central portions of the Ukraine, in the piedmont regions of the Trans-Caucasus and Caucasus, Moldavia, Volgo-Vyatskiy Rayon and in some areas of western and eastern Siberia. In 1986, the formation of such centers is also quite probable in a number of regions in the steppe portion of the Ukraine and the Caucasus. The commencement of the phase in which the populations emerge from their depression is at hand. In this regard, protective measures are required on a larger area than was the case last year.

Locusts. Unfavorable conditions (rainfall, return of cold weather and even snowfalls) for the survival and development of larvae, especially those for Asian and Italian locusts, developed in almost all areas during the spring.

A local increase in the number of Asian locusts is expected: in the Apakulskiy, Balkhash-Iliyskiy and Amudarinskiy nesting areas and in the southern portion of Uralsk Oblast. The overall volume of preventive treatments can be lowered compared to that planned for 1985.

The Moroccan locust has been observed on a number of pastures in Surkhan-Darya, Kashka-Darya, Samarkand, Tashkent, Chardzhou and Leninabad oblasts and in Azerbaijan. Centers of a raised density for the populations of this pest will probably occur in these regions this year. However, a reduction in the volumes of treatments is recommended.

The Italian locust has been observed in various areas in Tajikistan, in Uralsk and Pavlodar oblasts and in the Volga region. In these and bordering regions, preventive treatments are required on the same areas treated last year.

Non-gregarious locusts pose a threat to pastures, haying lands and crops in a number of regions in northeastern Kazakhstan, the Volga region, western Siberia, Yakut ASSR and Azerbaijan. The volume of treatments to be carried out against these pests is roughly for the same level employed last year.

During the autumn of 1984, winter and other chewing moths were encountered on crops in all portions of the area and in some regions their numbers were considerable. During the wintering period, the destruction of caterpillars amounted to only 5-15 percent. The weather conditions during the spring and summer period of last year in the European portion of the USSR did not favor the development of the moths. Thus their colonization was not observed and only local damage was noted. In all areas, the flight of the butterflies was late, weak and prolonged and the number of caterpillars -- low. Centers containing from 4 to 25 caterpillars per square meter were uncovered on farms in Rostov Oblast and in Stavropol Kray.

In the zone of one generation (Volgo-Vyatskiy Rayon and the Urals), the density of the pest populations will be low. In the zone of two generations (central-chernozem region, the Volga region, north Caucasus, the Ukraine and Moldavia), the second generation has developed under optimum conditions. Here, in a number of areas, an increase in the damage caused by chewing moths is expected. The volume of treatments will be maintained at the level for last year. A higher degree of effectiveness should be achieved in use of the principal method for combating chewing moths -- the biological method.

Leaf chewing moths have caused local damage. The predominant species is the cabbage moth; it damaged crops in the north Caucasus, the lower Volga region and in the central chernozem region, where on some fields 3-5 percent of the plants were colonized by caterpillars. A high number of 1st generation caterpillars was observed in pea plantings on a number of farms in the southern regions of Moldavia. Frequent rainfall often lowered the effectiveness of the biological method (trichograms).

The second generation of the cabbage moth was more numerous; in addition to the regions mentioned, it was also observed in Gorkiy and Sverdlov oblasts.

Centers of the clover moth were also uncovered in sugar beet and alfalfa plantings in southern Kazakhstan and in the central chernozem region.

Local damage was inflicted on plantings of perennial grass, winter wheat and sugar beets by the wild moth (Alma-Ata, Dzhabul, Chirkent, Issyk-Kul, Omsk and Talas oblasts and Stavropol Kray).

The first generation of the cotton moth in the Lower Volga region and the north Caucasus, on tomatoes and corn sowings, posed no danger. The second generation of this pest has increased in number. Its caterpillars have colonized a large number of tomato and corn plants in some areas of Krasnodar Kray and the Checheno-Ingush, Dagestan and Kabardino-Balkar ASSR's.

This year the leaf chewing moths may cause damage to crops in the European portion of the USSR and in the southern Urals. Protection against them must be carried out in a more intensive manner than was the case last year.

The beet webworm is found in centers of infestation throughout the entire area. During the wintering period, 3-7 percent of the caterpillars in the European portion of the USSR perished. The webworm completed its pupation here in the middle of May and the flight of the butterflies commenced. In some areas of the Ukraine and the north Caucasus there are 5-6 butterflies per 50 steps on arable lands and 4-10 on non-arable land. The laying of eggs commenced during the last 10 days in May and individual caterpillars were observed in perennial grass plantings and in weed vegetation during the second half of June. During the last 10 days in June, cold and rainy weather lowered the viability of the caterpillars and no damage by them was noted. The flight of the butterflies was late in the Volga region and yet the development of the first generation took place under comparatively favorable conditions (moderately warm and damp weather). In 1985, the number and spread of first generation caterpillars increased on a number of farms in the Volga region. Centers of increased numbers of butterflies of the generation which had hibernated and first generation caterpillars were observed in individual areas of the central chernozem region in plantings of peas, corn, sunflowers and perennial grasses and protection was provided for them with the aid of trichograms.

On lands that were inspected in the Baltic republics, Belorussia, the central regions of the RSFSR and Moldavia, the beet webworm was not detected.

The second generation of the pest was few in number in the central chernozem region, the Ukraine, Moldavia, the Volga region and in the north Caucasus and there was no need for launching a campaign against it. However, the preparation of the pest for the wintering period took place under favorable conditions and thus the forecast calls for an expansion in the area in which it can cause damage in the European portion of the USSR.

In Siberia, 27 percent of the wintering beet webworms perished (9 percent as a result of infection by fungus diseases and 18 percent -- damaged by entomophages). There was an increased number of cocoons on a number of farms in the Altay and Krasnoyarsk krais and in Omsk, Novosibirsk, Irkutsk, Orenburg and Kurgan oblasts. The cold spring delayed the development of the pest. The flight of the butterflies began during the second 10-day period in June and the hatching of the caterpillars -- on 24 June. A maximum number of caterpillars was recorded in Omsk Oblast. A count of 0.7-5 specimens per square meter was recorded on some farms in the Altay Kray. Incessant rain showers brought about a reduction in the number of caterpillars. Protection against them was required over a limited area.

In eastern Siberia, the caterpillars pupated one week later than in 1984. The flight of the butterflies commenced during the middle of June and the hatching of the caterpillars -- during the third 10-day period in July. The number of caterpillars was low. No campaign was launched against them.

In Kazakhstan the beet webworm was encountered in plantings of perennial grass, fodder beets, sunflowers, rape, peas and corn. The flight of the butterflies, owing to a cold snap, occurred in two waves -- at the beginning and the end of May. The mass hatching of caterpillars commenced on 11 June and their pupation -- on 27 June. In some areas, more than one fourth of the plantings inspected were colonized by the caterpillars, but their number, with the exception of centers in Kokchetav Oblast, was not very high (0.3-0.9 specimens per square meter).

The warm weather and brief rainfall promoted the development of the first generation in western Siberia and Kazakhstan and the timely hatching of the second generation caterpillars. In eastern Siberia, where the feeding of the caterpillars took place at a lower temperature, a portion of them, as usual, entered diapause.

This year, an increase in the numbers of beet webworms is expected in western Siberia (Omsk and Novosibirsk oblasts and the Altay Kray), Kazakhstan (Pavlodar, Kokchetav and Uralsk oblasts), eastern Siberia (Krasnoyarsk Kray and the Buryat ASSR) and in the Volga region (Bashkir ASSR and Tatar ASSR, Ulyanovsk and Kuybyshev oblasts). A need exists for uncovering more completely the centers of concentration of the hibernating cocoons. These areas should be thoroughly worked in the early spring using disk harrows. This measure can aid in reducing the survivability rate of the caterpillars and cocoons.

An increase in the number of caterpillars in some centers in the north Caucasus, the Ukraine and Moldavia is also a possibility.

The number of treatments carried out last year against the beet webworm, owing to their insufficient effectiveness and frequent rainfall, was higher than that planned. This year, assuming the spring period will not be too cold, protective measures may be required on large areas.

Butterfly (*Pyrameis cardui*). Increases in the numbers of this pest are being observed locally. Last year the propagation of this insect was noted on a number of farms in the Ukraine and the north Caucasus. The butterflies laid their eggs mainly on weeds of the thistle family. The caterpillars fed mainly on these plants, but they also damaged cultivated plants. On some farms, their numbers reached 20-50 specimens per sowthistle plant and 4-5 specimens per sunflower plant. The second generation was somewhat less numerous. Insecticides were employed against the first and second generations. The possibility exists that this pest will be found again this year in the same areas of concentration in the Ukraine and the north Caucasus.

Click beetles and pseudo-click beetles. On some farms, these pests have been observed on 50-60 percent of the area inspected. In 1985 the weather conditions promoted an increase in the harm caused by them in a majority of regions. This year the number of treatments carried out against click beetles will be increased. In this regard, the farms must inspect their fields more thoroughly and completely and ensure the timely organization of preventive treatments, while taking into account the recommended economic thresholds for damage sustained. This work is especially important on fields set aside for crops to be grown using the intensive technology.

Grain Crop Pests and Diseases

Pentatomid (*Eurygaster integriceps*). A considerable number of hibernating cocoons (40-75 percent) perished as a result of prolonged freezing of the soil in the northern regions of the area and the periodic formation of ice crust in the south. The physiological condition of the surviving specimens deteriorated in all areas following hibernation. Thus an updated forecast in April recommended a reduction in the number of treatments compared to the number proposed in the long-term forecast.

The flight of the beetles from the hibernating areas took place in a unanimous manner, but the overall area of crops colonized by them and the maximum density were considerably lower than the figures for last year. However, in a number of areas the campaign waged against the beetles was carried out without taking into account the economic thresholds for damage sustained. The hatching of larvae in the north Caucasus, the Ukraine, Moldavia and in the Volga region occurred during the second half of May and in the remaining regions -- during the first and second 10-day periods in June. Subsequently, owing to sharp fluctuations in temperature, frequent driving rains and dry winds, the development of the pentatomid was restrained and its survivability rate lowered.

A negligible increase in the numbers of pentatomids is possible in 1986 on a number of farms in the Ukraine and the north Caucasus. In other regions, this species is in the depression phase. This year the number of treatments will be reduced compared to the number carried out last year in regions where the pest was depressed and in the north Caucasus and Ukraine the number will be retained at the former level.

Grey grain moth. Sixteen percent of the hibernating caterpillars perished (10 percent from diseases and 6 percent from entomophages). The body weight of the caterpillars turned out to be raised (300-400 milligrams). The flight of the butterflies occurred 10-15 days later than usual and the intensity of this flight in all areas, with the exception of Kustanay Oblast, was low. The fertility rate of the grey grain moth was lower than average.

In 1986 there will be no change in the spread of the grey grain moth. However, protective measures are required on a smaller area than last year.

Grain beetle. The dry weather that arrived in late August and early September in 1984 brought a halt to the colonization and propagation of the pest. The larvae which had appeared in October, ceased eating in the middle of November owing to a stable cold snap and did not resume eating until spring. Thus the larvae posed the greatest danger not in the autumn of 1984 but rather in the spring of last year, at which time the compensatory potential of the plants was low and their sensitivity to damage was high. The larvae completed their spring feeding in early May and by the end of May they had commenced pupating. In early June the beetles began damaging ears and up to 30 percent of the ears on some fields were damaged in various areas. The harvesting of the winter grain crops was delayed as a result of cool and rainy weather during the month of July. This enabled the beetles to remain active up until the end of July and they concentrated under wind-rows and continued to feed on the grain. Following a brief dormancy in August, the beetles appeared on the surface of the soil and began propagating. By the time the winter grain seedlings appeared, the larvae had reached their second age and posed a threat to the winter grain crops. This raised a need for intensifying the campaign against the beetle in the autumn of 1985. An effective protection will also be needed for the crops this spring and in all probability in the autumn as well.

Last year, leaf beetles caused damage on a number of farms in the north Caucasus and the Ukraine; they were developed to a lesser degree in the Volga region, in Volgo-Vyatskiy Rayon, in the Altay, western Siberia, the central

chernozem region, Kazakhstan, Moldavia, Azerbaijan and Kirghizia. In centers of infestation on some fields, from 4 to 400 beetles per square meter were noted and larvae -- from 10-30 to 300-1,035 specimens. The number of treatments against the leaf beetle is increasing and this trend will also be continued this year.

Greenbugs. The weather conditions during the spring and early summer were unfavorable for their propagation in all regions of the European portion of the country. The spread of the bugs has also been restrained by entomophages. Some centers of greenbug infestation have been recorded in Moldavia, Estonia, the Kabardino-Balkar ASSR and in Ulyanovsk and Saratov oblasts. During the autumn, they caused local damage to winter crops in the southern regions of the European portion of the USSR.

In 1986, the spread of the bugs will depend mainly upon the weather conditions during the spring. In the event of a moderately warm and damp spring, early colonization of the plantings will take place and thus protective measures will be required on a considerably greater area than was the case last year and if the spring period is dry -- on the same area.

Grass flies posed less of a threat than they did in 1984. This year, an increase is possible in their numbers in some regions. The campaign against grass flies will be carried out mainly in a complex against other pests as well. During the coming year, there will be considerably fewer special treatments than is usually the case.

The striped grain flea (*Phyllotreta vittula*) and the stem flea (*Chaetocnema aridula*) have been encountered on a limited area. The same situation will prevail this year.

Corn weevils have caused damage to crops in the central chernozem region, the southeastern oblasts of the Ukraine and in Moldavia. An increase in their numbers has been noted in recent years. Special urgency is being attached to providing protection against the corn weevil in those cases where crops are being cultivated using the intensive technology.

In 1986 they may cause damage in a number of regions in the north Caucasus, the Ukraine, the Volga region. The campaign against this pest must be intensified.

Smut diseases have been noted in many regions, but they have manifested themselves only weakly. Covered smut has developed to a stronger degree than in 1984 in the central region of the RSFSR.

Powdery mildew has been recorded in all zones. In crops grown using the intensive technology, the disease has manifested itself only to a weak degree and yet its spread has been considerable. On many farms, owing to the use of fungicides, the damage caused by powdery mildew was lowered.

In a number of regions, the disease appeared in plantings in the autumn of 1985. This year, its development will depend mainly upon the weather during the growing season. In all probability, fungicide treatments will have to be carried out in the same volume as during 1985.

Root rot was encountered in all zones. In the case of winter crops on some farms in Volgo-Vyatskiy Rayon, the central chernozem region, the north Caucasus, Moldavia and the northwestern Ukraine, infection of 10-50 percent of the plants was noted for a rating of 1-1.5 balls and in Tula and Ryazan oblasts -- 2 balls. The intensity of spring wheat damage was considerably lower.

On some fields in Bryansk, Kaluga, Orel, Tula and Moscow oblasts, such conditions as empty ears, white stalks and white ears were noted in the grain crops and in the Ukraine -- fermentative-mycose loss of grain.

This year, root rot will pose a threat in regions having a high level of specialization in their grain economies. The degree of harm caused by the disease will depend upon the soil condition and the weather conditions during the growing season.

Snow mould was recorded in various areas in the northwestern, central and central chernozem regions, in Volgo-Vyatskiy Rayon, Belorussia and partially in the north Caucasus. The disease manifested itself weakly (not more than 1 ball), but the quantities of infected plants on some fields reached 20-75 percent. In order to prevent the development of snow mould, the crops should be treated with fungicides in the autumn, a mineral fertilizer top dressing applied in the spring and harrowing operations carried out.

Corn Pests and Diseases

The corn borer posed a threat on a number of farms in the Ukraine, the north Caucasus and Moldavia and locally in the central, the central chernozem and Volga regions. The cool rainy weather and the commencement of summer were favorable for the pest. However, the periods for the development of the first generation were prolonged and this hampered the campaign carried out against it. In the principal regions for the cultivation of corn for grain, the ecological situation promoted a high fertility and survivability in the pest. The difference between colonization of the pest in non-irrigated and irrigated corn plantings is substantial and this is typical of this species, especially during dry years. However, this difference was not observed.

In 1986, an increase is expected in the degree of damage to be inflicted by the corn borer in certain regions of the north Caucasus, the Ukraine, Moldavia, especially in irrigated plantings. The principal method for combating this pest will be the release of trichograms during the egg laying period. In a zone where two generations of the pest are developing, trichograms should be released 5-6 times. In the process, considerable importance is attached to determining the periods during which the pest lays its eggs. Provision should also be made for the use of pesticides on severely infested crops. In order to lower the degree of infestation by the corn borer, the corn stalks which fell and remain out on the fields and which usually contain the principal portion of the hibernating population should be milled and plowed under in a timely manner.

Of the corn diseases, loose smut, common corn smut and stalk rot were recorded. The intensity of their development was weak. High quality pre-sowing treatment of the corn seed at grading plants is needed in order to prevent the spread of these diseases.

Cotton Pests

The winter moth has been observed on seedlings mainly in Uzbekistan, Tajikistan and Tashauz Oblast in Turkmenistan. The number of 1st generation caterpillars on some farms ranged from 1 to 2.4 specimens per square meter. Protective measures were carried out on a smaller area than planned using biological (60 percent) and chemical (40 percent) means. In 1986 the number of treatments carried out against the winter moth will be the same as in 1985.

The boll-worm was relatively few in number during 1984 owing to the early cessation of cotton growth. The population density was not very high. Raised numbers were observed in the case of the second and third generations of the pest on a number of farms in Uzbekistan, for all generations in Tajikistan and for the first generation in Azerbaijan.

Considerably fewer treatments were carried out compared to the number planned and 60 percent of them were carried out using the biological method. During the coming year, an increase is not expected in the damage to be caused by the boll-worm and protection against this pest must be carried out on larger areas than was the case last year. The proportion of use of biological means remains the same.

Suctorial pests (common spider mite, aphids, thrips) colonized the cotton plants during the early periods. A maximum number of them were recorded during July: in some areas, there were 656-1,000 mites and their larvae and up to 3,000 aphids per plant. Thereafter the propagation rates for the suctorial pests and the density of their generations declined. Thrips are encountered on crops locally. The number of protective treatments corresponded to those planned and the same number is planned for this year.

Sunflower Pests and Diseases

Beet pests, click beetles and false click beetles caused damage to sunflower crops in various areas in the north Caucasus, the Ukraine, the central chernozem region and the Volga region. The population density on some farms in the Ukraine reached an average of 0.2-0.8 specimens per square meter and in Stavropol Kray -- 1.4.

The mentioned pests may cause greater damage this year in all regions where sunflowers are sown for seed purposes.

Storage rot (sclerotinia). In some areas, up to 11 percent of the plants were affected by the root form and up to 40 percent -- by the foliar form.

In the RSFSR, false mildew manifested itself (on some farms, up to 13 percent of the plants were affected by it) to a weaker degree than in the Ukraine and Moldavia.

The moulds developed at a more intensive rate during the pre-harvest period, especially when the ripening of this crop was delayed.

In order to limit the spread of diseases, dessication of the plantings and harvesting and processing of the crops should be carried out in a timely manner. In addition, the seed tracts should undergo phyto-cleaning.

Sugar Beet Pests and Diseases

Weevils (common and grey). Their population density in some areas reached from 0.1-4 to 10 weevils per square meter. Intensive protective measures were carried out. The fertility of the weevils was sufficiently high, but the maturing of the females was delayed owing to a cold snap that extended the egg laying period. Prior to the end of the growing season, the predominant portion of the common beet pest population had reached the adult stage. Thus its winter hardiness must be good.

In 1986 the campaign against the weevils should be intensified.

In Kazakhstan and Kirghizia, the beet crops sustained damage caused by stalk-cutting weevils (in some areas, up to 10 larvae per plant were recorded).

Beet flea beetles posed a threat to seedlings on a number of farms in the central chernozem and Volgo-Vyatskiy regions, the Volga area, western Siberia, Moldavia, the Ukraine, north Caucasus, Kirghizia, Kazakhstan and in the Baltic republics. In 1986 the spread of beet flea beetles will continue at the same level as that for last year.

Leaf beetle. Specimens which emerged from hibernation caused damage in the north Caucasus, the Ukraine and in Moldavia. On some farms, approximately 35 percent of the plantings inspected were infested by these insects and on 65 percent of the plantings the population density was higher than the economic threshold for damage. Pesticides were employed for protecting these tracts.

During the coming year, it is expected that the leaf beetle will cause local damage in the north Caucasus, the central chernozem region, the central and southwestern portions of the Ukraine, Moldavia and in Belorussia. The number of treatments may be increased compared to last year.

Beet beetles posed a threat to local tracts in the Ukraine and Moldavia. The beetles appeared on beet seedlings in late April and early May. In some areas, they infested approximately 40 percent of the plantings inspected, 80 percent of which had been treated with chemical means for protecting plants.

In 1986, a spread of the beet beetle is expected in the same regions. The number of treatments will be continued at the same level as that for last year.

The corn leaf aphid caused only weak damage to beets in the central-chernozem region, Latvia, Belorussia, Moldavia, the Ukraine and the north Caucasus. The propagation of this insect was restrained by entomophages, with entomophthorosis being noted during the second half of July. The plans call for protective treatments to be carried out on a smaller area than last year.

The spinach leaf miner was recorded locally. On some farms, there were up to 40 eggs per plant in the centers of their infestation. Protective measures were required on a larger area than planned. This year the spinach leaf miner is expected to expand in numbers in areas in the Ukraine, the central-chernozem and central regions, the Volga area, Belorussia, western Siberia and in the Baltic republics. The number of treatments must be increased compared to those carried out in 1985.

On a limited area in Belorussia, Latvia and the Ukraine, an increase took place in the damage caused by carrion beetles, in the Ukraine and the central-chernozem region -- by the sandy darkling beetle, in the central-chernozem region, Kirghizia and Kazakhstan -- by beet bugs on seed plants, in the north Caucasus, the southern Ukraine and Kursk Oblast -- by the leaf miner.

The root borer was encountered in various areas in the Ukraine, Moldavia, Kazakhstan and the central-chernozem region.

Cercosporosis appeared late in areas of concentration in Moldavia, Belorussia, Kirghizia, Kazakhstan, the Ukraine and in the north Caucasus. On some farms, 40-70 percent of the plants were infected.

Mildew was recorded in Kazakhstan, Kirghizia and Moldavia.

Owing to frequent rainfall, treatments against the sugar beet diseases were carried out only on that portion of an area where such treatment was called for. This year the plan for treatments may be lowered.

Pea Pests and Diseases

Sweetclover weevils. On the average, their number in the RSFSR was lower by a factor of two than the figure for 1984. They were even fewer in number in the Ukraine. It was only in Belorussia, during the seedling period for the peas, that up to 70 weevils per square meter were counted in some areas and during the period of ripening -- 278 weevils for every 100 sweeps of an insect net.

This year, a certain expansion is expected in the spread of the weevils. The number of treatments carried out against them will be increased.

The leguminous aphid infested considerable areas on some farms in the RSFSR, the Volga area, western Siberia and Moldavia. In other regions, the aphid did not inflict any damage. For the coming year, the plans call for protective measures to be carried out against this pest on the same areas as last year.

The pea weevil was encountered in various areas in the north Caucasus, the central chernozem region, the Volga area and in the Ukraine (in Khmel'nitskiy, Ternopol, Kiev, Odessa and Zaporozhye oblasts). The number of treatments carried out against the pea weevil will be continued at the former level.

The peamoth was noted on a number of farms in the Volga area and in the central-chernozem, Volgo-Vyatsk, Uralsk and central regions and in Latvia. In 1986 the campaign against the peamoth must be intensified.

Ascochitosis developed mainly on a number of farms in Volgo-Vyatskiy Rayon and in Moldavia and to a lesser degree in the Tatar ASSR and the Bashkir ASSR. Similar situations are expected this year.

Locally the plantings of peas were infected by root rots (in the western oblasts of the Ukraine and in the Volgo-Vyatsk and central-chernozem regions), peronosporosis and by mildew.

Perennial Leguminous Grass Pests and Diseases

The alfalfa weevil caused damage in some areas to alfalfa plantings in the Ukraine (Odessa, Voroshilovgrad and Zaporozhye oblasts), in Moldavia, the Volga area, Armenia, Kazakhstan (Dzhambul Oblast), Turkmenia, Tajikistan and in the north Caucasus. In 1986, it may cause an increasing amount of damage on a number of farms in the Central Asian republics, the Trans-Caucasus, the Ukraine and the north Caucasus.

Seed-eating insects posed a threat to alfalfa and clover plantings in all areas. This year the danger of intensive infestation by this pest will continue.

Bugs (alfalfa plant bugs and horseflies) caused damage to alfalfa plants in various areas in the Ukraine, Moldavia and Kirghizia. This year, assuming dry and hot weather, their numbers may be high on some farms in Central Asia, the north Caucasus, the Ukraine, Moldavia and in the central-chernozem region.

Brown patch was encountered on alfalfa and clover in all areas. The harm caused by it will be continued this year.

On the whole, the number of treatments on alfalfa and clover plantings will be increased during 1986.

Potato Pests

Colorado potato beetle. A high number of beetles which had emerged from hibernation was observed on a number of farms in Moldavia, the Ukraine, the north Caucasus, the Trans-Caucasus, the lower and middle Volga regions, the southern Urals, western Siberia, Kazakhstan and Central Asia. The number was higher than in 1984 in the eastern and southern portions of the central region, the northern Volga area, the southern part of the Volgo-Vyatskiy region and in the Urals and it was lower in Lithuania, Latvia, the northwestern and central regions, in the northern part of Belorussia and in Volgo-Vyatskiy Region. Cool and rainy weather in a majority of the regions restrained colonization by the beetles, compared to 1984 there was no increase in the area populated by them and in fact a decrease was even noted in the northern part of the area (Leningrad, Kalinin, Kostroma, Yaroslavl, Perm and Kirov oblasts).

Low temperatures and rainfall during June lowered the survivability of the new generation in the nonchernozem zone of the RSFSR, Belorussia, Lithuania and Latvia. A reduction took place in the damage caused by the first generation in the southern regions of the area. It became perceptible only during July and August. The feeding base of the insect deteriorated in a number of regions owing to the development of phytophthora. However the number of hibernating bugs increased on a number of farms in the nonchernozem zone of the RSFSR, Belorussia, the central-chernozem region and the middle Volga area and it became more weak in the Baltic area, in the northwestern region, to the north of the central and Volgo-Vyatskiy regions and in the Urals.

In the spring of this year, the area populated by the beetles in the mentioned regions will decrease in size. In the southern part of the area, the population density will be high during the spring. The overall number of protective operations will be reduced somewhat compared to 1985.

Vegetable Crop Pests and Diseases

Cruciferae family fleas, cabbage flies, diamond back moths, white butterflies, cutworms, cabbage and melon aphids, concentrations of snout beetles, onion maggots and thrips were encountered on vegetable crops. Of the diseases -- peronosporosis on cabbage and onions, phytophthora, macrosporiosis and rot on tomatoes, mildew on cucumbers and bacteriosis on cabbage and cucumbers.

Cruciferae family fleas caused average and strong damage to plants in various areas in Irkutsk, Yaroslavl, Donetsk and Chernigov oblasts and in Latvia.

Cabbage flies were noted in all areas. Their numbers had increased noticeably in Belorussia.

Of the leaf-chewing pests, cabbage and turnip white butterflies, cabbage cutworms, diamond back moths and caterpillars of second generation moths were observed. The infection of caterpillars by entomophages was noted -- cabbage butterfly parasite and others (in Moldavia, 23 percent of them were infested by parasites and in the RSFSR -- from 12 to 75 percent) and damage by bacteriosis (more than 20-22 percent of them in Kursk, Kirov, Kostroma and Kaluga oblasts).

The cabbage cutworm infested plantings on a number of farms in Belorussia (where its population density was considerably higher than in 1984) and in the Ukraine.

In some areas, an increase was noted in the number of cabbage aphids during the second and third 10-day periods in July.

Centers of onion maggot and onion thrips were noted among onions on a number of farms in Kirghizia, Kazakhstan and Armenia.

Damp and moderately warm weather promoted the development of diseases in cabbage -- peronosporosis, bacteriosis (vascular and mucilaginous), wire stem and clubroot. Fusarial wilt, phomosis and alternaria blight of cabbage were recorded among cabbage plantings over small areas.

Onion peronosporosis was noted on a number of farms in the RSFSR and the Ukraine. The most favorable conditions for the development of the disease occurred in July. During this period, up to 80 percent of the plants were infected to a weak or average degree in some areas. Peronosporosis was also noted in some areas in Azerbaijan, Moldavia and Latvia.

Late blight of tomato was encountered on some farms in the RSFSR, Moldavia and the Ukraine.

The development of macrosporiosis on early tomato varieties was observed in some areas in the Ukraine (Poltava, Kharkov, Vinnitsa oblasts), in Moldavia, the north Caucasus and in the Volga and central-chernozem regions of the RSFSR.

Septoria tomato spot was recorded on a number of farms in the RSFSR, Moldavia. Black bacterial spot of tomatoes was noted partially in Moldavia, where it was

uncovered in some areas on 91 percent of the area inspected. Development of the disease was noted on a number of farms in Voronezh and Astrakhan oblasts and in the Checheno-Ingush ASSR. Black bacterial spot was also observed in some regions of the Ukraine and Kazakhstan.

Bacteriosis and mildew were encountered on cucumbers in the RSFSR and the Ukraine.

The number of treatments carried out against diseases was considerably less than the number recommended. For 1986, the plans call for protection to be provided for the vegetable crops in the recommended number of treatments.

Fruit Crop Pests and Diseases

In 1985, apple worm, apple moth, leaf roller moths, inch-worms and fruit mites were encountered just as in previous years. Inch-worms were noted in the pip fruit orchards of Belorussia and the Baltic republics and on some tracts they devoured the leaves. Scale insects and false scale insects were observed in the Central Asian republics and in the southern oblasts of the Ukraine. Of the diseases, scab and mildew of pip fruit and coccomycosis of stone fruit were noted most often.

Apple worm. The mortality rate for caterpillars which emerged from hibernation did not exceed 30 percent and only in individual regions of Moldavia did 40-50 percent of them perish. During the spring, in various areas in the Central Asian republics, there were from 1 to 20 overwintered caterpillars per tree. The orchards were sprayed mainly against first generation caterpillars. Thus the damage caused by the apple worm had increased considerably by the end of the growing season. Dry and warm weather predominated in the Ukraine, Moldavia and the southern regions of the RSFSR during the period of the flight of the butterflies and laying of eggs (end of May and beginning of June) and this promoted extensive colonization by the pest. In a majority of the orchards treated, the average amount of damage inflicted by the first generation caterpillars was not very high and in some areas ranged from 1 to 7 percent (a maximum of 13-27 percent). In the Trans-Caucasus republics, the number of caterpillars which emerged from hibernation was not very high.

One generation developed in Belorussia, the Baltic republics and the northwestern region of the RSFSR and the number of caterpillars was not very high. The damage inflicted on fruit in some orchards where protective means were employed ranged from 0.1 to 3 percent and in those areas where a campaign was not waged against the pest -- from 14 to 22 percent.

In 1986, no increase is expected in the harm caused by this pest in a number of regions in Belorussia and the Baltic republics. In Kazakhstan, the numbers of its first generation will be low in the southeastern and northern oblasts and the density of the second generation of the population will be restored. In the remaining horticultural zones, the apple worm will continue to be the principal pest of stone fruit crops and will require the carrying out of an entire complex of protective measures, as called for in the zonal systems.

Scab became apparent in the European zone of horticulture at a later date than in 1984 and its development during the first half of the summer was weak.

Subsequently, the spread and degree of development of the disease increased in scope. A further increase in the damage caused by this disease was halted as a result of dry weather being experienced during August in the Ukraine, the north Caucasus, Moldavia, the central-chernozem region and the Volga area. However, a high degree of infection remained on the leaves of stone fruit strains (especially susceptible varieties) and under favorable weather conditions this will serve as a source of infection this year.

The protection of orchards should be carried out in complete conformity with the recommended zonal systems. The number of treatments should be increased considerably.

Grapevine Pests and Diseases

The weather conditions last year in the principal viniculture zones promoted the intensive development of grapevine and biennial (*Clysia ambiguella*) leaf rollers, spider and grape mites and also leaf-chewing pests. Of the diseases, mildew developed at an intensive rate on a number of farms in the European portion of the country and oidium and anthracnose in the Central Asian republics.

Grapevine leaf roller. In the principal zones of the area, first generation caterpillars on some farms colonized 45-67 percent of the areas inspected. They were detected on 3-17 percent of the vines and 1-12 percent of the flower clusters. Owing to a large amount of precipitation which fell during June and July and the carrying out of protective measures, the number of second generation pests declined in Moldavia and the Trans-Caucasus republics. On the whole, an increase has been noted in some areas in the population density of the grapevine leaf roller compared to 1984. If the hibernation conditions are favorable, it will pose a threat to the grapevines this year.

Mildew. The first half of the season was favorable for the development of this disease in Moldavia, the Ukraine and the north Caucasus. Commencing with the second 10-day period in July, the conditions for pathogenesis in this region deteriorated and yet an abundant amount of dew brought about the appearance of spores on old spots. Commencing with the second half of July, the weather conditions in the Trans-Caucasus republics promoted the development of mildew. A campaign was carried out in conformity with the accepted system. Mildew will continue to be the principal vineyard disease during the coming year and the intensity of its development will depend upon the weather conditions and the timely manner in which prophylactic treatments are carried out.

Oidium was noted occurring in areas of concentration. In some areas, its spread on leaves did not exceed 20 percent and on clusters of grapes -- 3 percent. It appeared 10 days earlier than usual in the Central Asian republics. The weather conditions promoted the development of the disease.

This year the number of prophylactic treatments carried out at vineyards must be maintained at the same level planned for last year.

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19 March 1986

MAJOR CROP PROGRESS AND WEATHER REPORTING

BRIEFS

FIRST CLASS SEED--Orenburg, 19 Dec--The oblast's seed control laboratories, which are presently analyzing the seed samples being received from kolkhozes and sovkhoses, have noted an overall improvement in the quality of the seed. This is the result of tense work on the part of the agronomists and tireless labor by farmers engaged in the preparation of seed. In Krasnogvardeyskiy, Saraktashskiy and Sakmarskiy rayons, up to 96-98 percent of the seed procured has been classified as first class of the sowing standard. This indicator has even reached 100 percent on farms in Belyayevskiy and Kuvandykskiy farms. /by I. Gavrilenko/ /Text/ /Moscow SELSKAYA ZHIZN in Russian 20 Dec 85 p 1/ 7026

RECOMMENDED FOR PRODUCTION--Kurgan, 23 Dec--Farmers in the Trans-Caucasus region quite properly consider highly productive varieties as one of the chief reserves for increasing grain production. Each year a council of agronomists -- a committee for strain regionalization -- assigns a grade of "good" to the more promising varieties. Recently the council recommended for production in all of the oblast's zones the spring wheat varieties Zhigulevskaya from Kuybyshev Oblast and the Voronezh bred Svetlana and also the best varieties of oats, barley and peas. Novosibirsk and Saratov bred spring wheat and the local Kurganskaya 1 variety were recommended for intensive production. /by I. Shevchenko/ /Text/ /Moscow SELSKAYA ZHIZN in Russian 24 Dec 85 p 1/ 7026

SEED IMPROVEMENT WORK--Kurgan, 21 Jan--Winter this year in the Trans-Urals region is distinguished by moderate frosts. Thus the grain growers are able to raise the quality of their grain and pulse crop seed to high sowing conditions. Of 489,000 tons, 94 percent is completely quality-standardized, with two thirds of this amount meeting the requirements for first and second class. /by I. Shevchenko/ /Text/ /Moscow SELSKAYA ZHIZN in Russian 22 Jan 86 p 1/ 7026

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LIVESTOCK FEED PROCUREMENT

UDC 633.21.4.00.3

NEED TO STRENGTHEN FEED BASE OF RSFSR NONCHERNOZEM ZONE

Moscow EKONOMIKA SELSKOGO KHOZYAYSTVA in Russian No 12, Dec 85 pp 24-27

[Article by I. Letunov, deputy chairman of the presidium of the RSFSR Nonchernozem Zone Department of the Academy of Agricultural Sciences imeni V. I. Lenin: "On the Development of Feed Production in the RSFSR Nonchernozem Zone"]

[Text] Feed occupies a key position among the basic elements of the material production base of animal husbandry that determine the optimal development of the sector. The degree to which animal husbandry is supplied with feed is used as a criterion for evaluating the economics of agricultural production.

Feed production consists of a specific set of sectors--field and meadow pasturing, as well as industrial fodder production. Intensification of this production has a significant effect on the efficiency with which land and material and monetary resources are utilized, and on the productivity of animal husbandry. One of the key tasks of the intensive system of fodder production is efficient utilization of fodder lands that provide the maximum yield of feed per unit of land area with a consistent reduction in the consumption of labor and funds per unit of fodder production.

As a result of rational organization of the feed base and intensification of fodder production, many leading kolkhozes and sovkhoses in the RSFSR Nonchernozem Zone have achieved a high level of efficiency in the utilization of each hectare of fodder land and in providing animal husbandry with feed.

The high population density in a significant portion of the zone and its specific natural and economic conditions determined the basic directions for the development of agriculture, in which livestock products play a leading role. The primary and largest sector of animal husbandry is beef and dairy farming. Hog breeding and poultry farming are also important here.

The most important problem in the development of animal husbandry in the zone is to increase the stability of the fodder base. The rate of fodder production is lagging behind the rate of reproduction of the livestock population, and this is one of the imbalances in agriculture. For this reason the decisions of the 26th CPSU Congress state that a comprehensive program for the creation of a reliable and balanced fodder base for animal husbandry in this country must be drawn up and implemented.

We define the concept of "stability of the fodder base" as an economic category as follows: a complex system of technological, technical, organizational, economic, and biological measures which is aimed at ensuring expanded reproduction of soil fertility and a consistent increase in the productivity of the fodder-growing area, and makes it possible to avoid dependence on unfavorable environmental conditions. Comprehensive implementation of these measures based on application of scientific and technical achievements in plant breeding, agricultural engineering, land improvement, chemicalization, mechanization, and specialization, will make it possible to create a solid fodder base that will guarantee accelerated development of animal husbandry.

Resolution of the problem of fodder quality is of great economic importance. Utilization of poor-quality feed hinders growth in livestock productivity and leads to overconsumption of feed per unit of livestock production and to an increase in production costs. Poor feed quality cannot always be compensated for by increasing the quantity of feed.

The following are requirements for maximum preservation of nutrients during fodder procurement: harvest operations must be carried out in a short period of time and at a rapid pace, technological operations and organizational and technological maneuvers must be carried out in a continuous, uninterrupted way. A number of factors affect the quality of feed: an increase in the crop yield, rational application of chemical means, application of lime to the soil, sowing mixtures of grain and fodder crops, concentrated sowing of corn and sunflowers with grasses and legumes, the development of new grain forage and fodder varieties that are needed for the production of high-quality mixed feed in industrial poultry farming and for providing animals in dairy farming and hog farming with all the necessary nutrients.

With the aim of improving the quality of fodder and other agricultural products, a comprehensive quality control system has been worked out on the basis of standardization. In Lvov Oblast in the Belorussian SSR this system has been put into practice successfully. The control system should be focused in two directions: the quality of the performance of operations in the technological process of raising fodder plants, and the deadlines for and the duration of the performance of fodder procurement operations based on progressive technologies.

Unfortunately, there are still no adequate methods for determining the quality of plant products and fodder. In our opinion, it would be a good idea to create effective fodder quality control services at kolkhozes and sovkhozes. In addition, inter-rayon and inter-farm laboratories should be organized and equipped with contemporary equipment and instruments for conducting a full-scale analysis of fodder at the farms being served, and to form a standard fodder quality control system for the republic.

The production of fodder on agricultural land plays an important role in strengthening the fodder base. More than 75 percent of the fodder in the Nonchernozem Zone is harvested and procured from agricultural land, and fodder and grain forage crops account for 77 percent of the total area under cultivation.

The introduction of a conveyor system for fodder production represents a major reserve for rational organization of the fodder base, for increasing fodder production, and improving fodder quality. A specialized fodder conveyor is created--for silage, hay, and raw and green fodder--which makes it possible to achieve regularity in fodder procurements, increase fodder production, improve fodder quality, distribute and utilize available manpower and harvesting equipment as rationally as possible, carry out harvesting operations within the optimal time periods, and reduce fodder production costs.

The key problem in fodder production in the Nonchernozem Zone is a further increase in the production of grain, especially feed grain. Only a steady rise in the harvest of feed grain will make it possible to achieve a steady rise in animal husbandry in the zone. Reinforcement of economic factors--further intensification of grain farming--will play a key role here.

In the system used to organize the fodder base for dairy farming, the key sector of animal husbandry in the zone, it is important to step up the production of grass and succulent feed, which provides the raw material base for the procurement of hay, haylage, silage, and artificially dehydrated fodder. Specialists in the Baltic republics believe that it is economically efficient to grow perennial grasses if their hay yield reaches 40 quintals per hectare.

Intensification of grass cultivation requires further improvements in the structure of the sown areas based on the cultivation of the most productive types and varieties of grasses. To do this it is necessary to introduce mixed grasses with a predominance of highly productive crops, such as awnless grass, dew grass, reed fescue, and alfalfa, over an area equal to no less than 30-40 percent of the land sown to perennial grasses. In the central and southern parts of the zone there should be a significant increase in the area sown to alfalfa, where its productivity is 30 percent higher than that of clover.

Implementation of these measures will make it possible to extend the biologically optimal time periods for the harvest by a factor of 2-2.5, and the protein and feed units will be increased by at least 20 percent.

In order to step up the production of fodder from grasses, seed farming must be developed, and this sector must be shifted to an industrial basis. Specialized seed farms under the "Krasnaya Baltika", "Syaglitsy", and "Gomontovo" production associations in Leningrad Oblast have gained some positive experience in producing grass seeds.

The production of succulent fodder can be increased by introducing industrial cultivation methods for corn and increasing its yield, achieving a rational combination of land sown to corn and land sown to annual cereal and legume grass mixtures, sunflowers, rape, and perennial grasses. Balanced procurements of silage from these crops make it possible to ensure great stability and reciprocal compensation for harvests in years with unfavorable weather conditions, and more uniform and rational utilization of manpower and equipment.

Fodder root crops play an important role in the creation of high-quality reserves of succulent feed at farms engaged in intensive dairy farming, and in the production of mixed silage for hog breeding. In an experiment conducted by the All-Union Fodder Scientific Research Institute imeni V. R. Vilyams, farm crop rotations were saturated with mangel-wurzel, which made it possible to increase field productivity by 22-68 quintals per hectare in dried form, and to increase net income by 20-30 percent.

The introduction of industrial flow line processes and rational organization of labor plays an important role in the system of organizational and technological measures for the cultivation of fodder root crops. Research conducted by the VNIETUSKh [expansion unknown] shows that on practically all the farms in the RSFSR Nonchernozem Zone, with the transition to the production of mangel-wurzel using flow line industrial technology, each hectare of land yields 500-600 quintals of beet crops and 250-300 quintals of beet greens. With this yield the output of feed units per hectare is 8000-9500, the production cost per feed unit is 5-7 kopecks, and the production cost per quintal of root crops is 0.5-0.8 rubles.

Under current conditions, intensive utilization of natural hayfields and pasturelands is becoming a key strategic direction, and one of the main reserves for the development of the fodder base at kolkhozes and sovkhoses in the Russian Nonchernozem Zone.

In the zone the total area of natural fodder land in the public sector is 14.7 million hectares, 6.8 million of which are covered by hayfields and 7.9 million of which are pasturelands. Land improvement measures are needed for 85 percent of the hayfields and 87 percent of the pasturelands.

In the Nonchernozem Zone land improvement is a basic direction for the intensification of fodder production. Surface and deep improvements in natural fodder lands can increase their productivity 2 to 6-fold or more. Leading farms in the zone obtain 400-600 quintals of vegetables per hectare of improved land, 250-300 quintals of potatoes, 350-400 quintals of green perennial grasses, and 5000-8000 feed units per hectare of irrigated crop land.

On the whole, however, at kolkhozes and sovkhoses the level of productivity of improved lands is inadequate. The yield from land that has undergone extensive improvements still does not correspond to the huge material resources being invested in land improvement construction.

Crop pasturelands in the zone make it possible to make efficient use of arable land. At the same time, many kolkhozes and sovkhoses do not devote enough attention to crop pasturelands, and their productivity is no more than 1400-2100 feed units per hectare. At the beginning of the 11th Five-Year Plan in the zone the area of crop pastureland per cow was 0.12 hectare, 0.06 hectare of which was irrigated. If one proceeds from the model norms for the amount of crop pastureland needed for one cow that were recommended by the All-Union Fodder Scientific Research Institute imeni V. R. Vilyams, the norms exceed the actual amount of irrigated land available for dairy cattle by a factor of 2.5-3.5, and for nonirrigated land by a factor of 3.5-4.5.

The set of organizational, economic, and technological measures to create intensive irrigated pasturelands include the following: proper selection of meadowlands; strict correspondence between the capacity of the pasture and its area and productivity; selection of a rational mixture of grasses for the pastures; a drive system for pasturing; organization of pasture rotation and rational utilization of the grasses; fertilization of pastures; irrigation of crop pasturelands with the establishment of a scientifically based system; calculation of the costs of fodder production; organization of labor and economic incentives for workers for maintenance of the pasturelands.

An increase in the production of feed protein is one of the most important problems, and the development of animal husbandry depends on successful resolution of this problem. In the Nonchernozem Zone the shortage of fodder protein has reached 22-25 percent. In connection with this, expansion of the area sown to grain and leguminous crops, perennial leguminous grasses, rape, and other high-protein plants, and an increase in their yield, are tasks of great state importance.

An analysis of annual losses of fodder products shows that 41 percent of the losses are due to violations of the deadlines for the harvest of fodder crops, 21 percent is lost as a result of violations of the fodder procurement methods, 25 percent of the losses are due to a lack of storage facilities, and 11 percent of the losses are the result of a shortage of chemical preservatives. It should be noted here that an increase in fodder resources resulting from a reduction in losses is much cheaper for the farms than the cultivation of additional crops.

Research done by the NIPTIMESKh NZ [expansion unknown] showed that under the conditions found in the RSFSR Nonchernozem Zone the optimal duration of the mowing operations from the first budding of legumes and the scutching of cereals is 10-15 days. An increase in the duration of the harvest operations by one day means an average loss of 0.46 million kilocalories in digestible energy per hectare of grass with a yield of 20 tons per hectare. The cost of the losses is 1.1 ruble per hectare per day.

Many kolkhozes and sovkhoses in the zone do not assign importance to adhering to deadlines for the harvest of grasses and for all practical purposes mow a significant portion of their area after they have flowered. As a result, fodder production falls short and there is a decline in the quality of the fodder.

At the same time, prompt completion of two or more hay harvests increases the yield of digestible nutrients per unit of area by a factor of 1.5-2, the yield of protein by a factor of 2-3, and the yield of carotene by a factor of 3-5, which makes it possible to obtain an additional 1500-2000 feed units and 180-200 kg of digestible protein per hectare.

Broad implementation of progressive methods for fodder procurement represents an important reserve for reducing losses and improving fodder quality. Industrial methods of fodder procurement require strict adherence to technological parameters. Properly prepared hay retains almost all the valuable properties

of green fodder, and it contains a high level of protein, amino acids, minerals, and vitamins.

However, 30-40 percent of the nutrients and 90-95 percent of the carotene is lost during the procurement of hay in the Nonchernozem Zone; this is because the grasses spend up to 4-5 days or more drying in the field as a result of frequently changing weather conditions, relatively low temperatures, and increased humidity, especially at night.

The duration of the drying time, and thus the losses of nutrients, can be reduced by a significant margin if pressed, crushed, and loose hay is dried artificially in hay storehouses with active ventilation.

Preparation of haylage is the most efficient method for preserving coarse feed in the Nonchernozem Zone. Its procurement is the least dependent on weather conditions, there is a reduction in the volume of transport operations, there is more economical utilization of fodder storehouses, and there is a 28-33 percent increase in the yield of nutrients per unit of fodder-growing area. One kilogram of well-prepared haylage should contain at least 0.30-0.35 feed units, 40-50 grams of digestible protein, and 30 milligrams of carotene.

A comprehensive evaluation of various technologies used in the procurement of fodder from perennial grasses shows that from the standpoint of maximum preservation of nutrients, the least consumption of labor and funds per 100 feed units, and the possibility of bringing in the harvest in a short period of time using highly productive harvesting combines, preference should be given to the preparation of haylage and chemical preservation of fodder.

With the great shortage of manpower resources in the Nonchernozem Zone, an increase in labor productivity based on full mechanization and the application of industrial flow line methods will be the primary condition for economic efficiency in the production of coarse and succulent fodder. Labor expenditures in fodder production are declining with the utilization of modern machinery and progressive technology, and the use of traditional technology requires 3.8 times more labor.

With the intensification of fodder production to reduce losses and improve the quality of coarse and succulent feed, improvements in the forms of organizing labor are taking on special importance. Practical experience shows that fully mechanized detachments for fodder procurement make it possible to introduce successfully the most rational methods and ways of utilizing harvesting machinery, and to apply progressive technologies for fodder procurement with the greatest efficiency. According to data gathered by the VNIPTIMESKh, organizing the work of technological links in the detachment for the procurement of haylage, crushed hay, and silage using a group method makes it possible to increase by a factor of 1.2 the time spent by harvesting equipment on its primary job--picking up dried grass or moving silage, and to reduce the demand for transport equipment by 20-25 percent.

Realization of the program for creating a material base for the processing and storage of fodder requires additional expenditures on the construction of special structures (fodder shops, storage facilities, warehouses) and on the

acquisition of equipment. According to estimates, capital investments on these structures and equipment should represent 20-25 percent of the total value of fixed production capital in animal husbandry, and now they represent 3-5 percent.

Further development of the fodder base at kolkhozes and sovkhoses in the Nonchernozem Zone is tied to the organizational restructuring and formation of fodder production as a specialized sector.

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LIVESTOCK FEED PROCUREMENT

MEASURES TO ENHANCE FEED QUALITY, PREVENT PROTEIN LOSS

Moscow SELSKAYA ZHIZN in Russian 21 Jan 86 p 2

[Article by M. Lupashku, Vice President of the Moldavian SSR Academy of Sciences and academician of VASKhNIL [All-Union Agricultural Institute imeni V. I. Lenin] and by Ye. Antonishin, deputy director of the central board of the republic agroprom [Agroindustrial association]: "For an Intensive Ration: Dealing Actively With the Protein Problem"]

[Text] In the last 3 years the livestock farmers of Yedinetskiy Rayon have increased the production of meat by 39 percent and of milk--by 15.5 percent in comparison to the preceding 2 years of the 11th Five-Year Plan. Milk yield from each cow surpassed 3,600 kilograms and increased by 570 kilograms. Such positive changes here are directly related to the intensification of feed production and to an increase in the reserves of vegetable protein. Enterprises produced 55-57 quintals of feed units per hectare of feed lands, or one-fifth more than at the beginning of the five-year plan.

This rayon is no exception. In a whole series of others, such as Brichanskiy, Drokiyevskiy and Slobodzeyevskiy, an acceleration in the development of livestock raising has also been noted. Within the republic a comprehensive program is being implemented to develop the feed base, the core of which is concern about increasing the productivity of agricultural crops and about feeds balanced in energy and protein. The basic directions for technology in the area of feed production and for the use of feeds have been determined. Intensive feed and grain-feed crop rotations with the use of large-scale and small-scale irrigation have become widespread. Crop structure has become more balanced.

Today the dominant crop in the feed fields is the valuable alfalfa crop; perennial pulse grasses occupy half of the area in feed crops. A qualitatively-new approach to the problem of increasing the procurement and preparation of corn silage during the phase of waxy ripeness of the grain has been implemented. Today corn silage has become the main energy feed in all enterprises in winter as well as summer rations; it has enabled us to decrease the proportion of grain forage. It has been calculated that with a transition to a new technology for procuring corn silage enterprises annually produce a supplementary 400,000 tons of feed units. It was the production of such a

highly nutritious silage, in addition to an increase in the productivity and yield of protein grasses and feed beets, that to a large degree contributed to the positive changes in livestock raising.

The republic has eliminated the debts that developed during the first years of the five-year plan as concerns the sale of milk to the state and has fulfilled the five-year plan. The average milk yield per cow increased by over 530 kilograms during the 5-year period and in 1985 comprised in excess of 3,400 kilograms. As for the productivity of the republic's feed fields, it has increased by 40.2 percent, and the yield of digestible protein--by 44 percent.

Still, livestock farmers feel that that which has been achieved is only the beginning of extensive work to develop a guaranteed feed base. The average statistical indicators still conceal the lags of a number of farms and enterprises. In 1985, for example, in almost half of the rayons the productivity of silage corn and perennial grasses was lower than the average republic level. There is still a great deal of variability in the cultivation of feed beets. An adequate feed supply is not being created everywhere by far and the work to improve feed quality, protein balance and irreplaceable amino acids is significantly incomplete. As calculations show, an additional 15-20 percent protein is needed in the feed produced for cattle, especially in winter rations. Each year thousands of tons of feed units are lost from the cultivated harvest during harvesting, shipment and storage.

The draft of the Basic Directions of Economic and Social Development for our country indicates ways to most quickly eliminate the gap between the production of feed protein and the demand for it. This involves the expansion of crop area and improved productivity of alfalfa, clover, peas, sunflowers, soybeans, rape and other crops as well as the extensive use for feed purposes of side products from the food and fish industries and food wastes.

In our republic the area in the most highly productive protein crop--alfalfa--has been expanded significantly. During the last 3 years the area in peas and soybeans more than doubled. Most attention is being focused on the growth in the productivity of each hectare of crops.

Over half of vegetable protein in the republic is produced by alfalfa. This crop is one with great potential, as has again been demonstrated by the practical experience of leading enterprises and by the research of scientific institutions. In 5-year tests conducted by the test base of the Moldavian SSR AS [Academy of Sciences], with regulated soil fertility (irrigation and fertilization) 200 and more quintals of feed units and 25-31 quintals of digestible protein were obtained on each hectare of the crop rotation area where alfalfa occupied 50 percent of the area.

It is true that a considerable amount of protein is still lost due to the incorrect approach toward utilizing alfalfa. In enterprises where sufficient reserves of succulent and coarse feeds are not created farmers strive, from early summer on, to produce as large a quantity of "greens" as possible, sometimes mowing immature grass. Something different is being done in Floreshtskiy kolkhozhivprom [Livestock Industry Kolkhoz] and in Malayeshtskiy Sovkhoz, which are characterized by the highest indicators in weight gain of

cattle and in milk yield. Here during this period only a portion of green mass is included in the ration and the largest portion is preserved in order to utilize the cultivated protein more fully. This type of technology is now being included in the plans of most enterprises.

In order to bring losses down to a minimum and to raise the quality of feed made from alfalfa, it is planned in the new season to store hay primarily by the method of pressing and active ventilation and haylage--in lined storage capacities covered with plastic panels.

One of the technological methods that raises the effectiveness of utilizing alfalfa protein may be so-called moist fractionation. Its essence consists of the fact that after additional crushing by means of pressing, the green mass is divided into fractions--the press residue, or alfalfa pulp, and the green juice. The latter is used to produce leaf-protein concentrate (LPK) through a process of coagulation, separation of protein and drying. The first fraction is completely suitable in protein content as a balanced ration for cattle. It is used both in fresh form as well as for the preparation of haylage and grass meal. LPK is introduced into mixed feeds as a high-protein vitamin-enriched supplement--it contains up to 50-55 percent protein, a significant quantity of carotene and other nutrients.

At the present time in the republic two shops for LPK production have been opened and the promising nature of moist fractionation has been confirmed--it enables us to produce up to 400-500 kilograms of protein concentrate. This method is less energy-consuming than the production of vitamin-grass meal.

Protein production can also be significantly increased by planting peas or soybeans. During the last 2 years the average yield of peas has equalled 25.2 quintals; in 1984 a record harvest of 31 quintals per hectare was achieved. Some sovkhoses and interfarm enterprises harvest 20-25 quintals of soybeans. On the basis of their experience the task has been established to increase the area of legumes within the structure of grain crops to 12-15 percent, to stabilize the productivity of peas on a level of 28-30 quintals and to procure no fewer than 3-4 quintals of legumes per cow during the 12th Five-Year Plan. Special attention will be given to increasing the gross yield of soybeans, the cultivation of which has not yet achieved large-scale results.

Breeders have contributed new varieties of barley with a high content of protein and amino acids to production. In connection with this the republic's kolkhozes and sovkhoses are making corrections in the structure of winter crops with the goal of increasing the share of barley to 40 percent, and in specialized feed-production enterprises--to 50-60 percent. An increase in the reserves of vegetable protein will also be facilitated by improvements in the structure of corn fields by means of the introduction of new, more productive, high-lysine hybrids with early maturation schedules, which is especially important for our conditions.

I must mention still another important reserve for increasing the production of feed proteins. It has been calculated that in agriculture and in various branches of the processing industry in the republic up to 8-10 million tons of secondary raw materials, side products and production wastes accumulate each

year. This raw material contains about 2 million tons of feed units and over 180,000 tons of digestible protein. Unfortunately, side products are still either used very inefficiently or are not utilized at all. In other words, we must create the necessary order here too.

Scientists, specialists and all workers of the republic's agroindustrial complex are now strengthening creative research in order to accelerate continued intensification in feed production. A significant increase in the "harvest" of vegetable protein will achieve the stable growth of output of livestock products.

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LIVESTOCK

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APPLICATION OF SCIENCE FOR LIVESTOCK SECTOR INTENSIFICATION

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[Article by L.K. Ernst, vice-president of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin: "Scientific and Technical Progress in Livestock Farming"]

[Text] Increase in the production of high-quality animal products is a major socio-economic problem, since satisfying the growing demands of the population for these products is one of the indices of its welfare.

Looking at the development of domestic livestock farming in retrospective, it should be noted that the majority of its branches have developed by the extensive route. At present the country has a huge population of farm animals. At the beginning of 1985, there were 120.9 million head of cattle, 77.8 million swine, and 148.9 million sheep and goats.

Analysis shows that untapped reserves for the extensive development of the industry have been used up. In the future, it may be developed only through intensification, one of the most important factors of which is scientific and technical progress. And the front line of the struggle for its acceleration lies through science. On the basis of the achievements of science during a short historical period, there has been a transformation from livestock farming of low productivity that was a legacy from prerevolutionary Russia. During the years of Soviet power, 87 new strains of livestock have been bred in the country, as well as a large number of types, lines, and crosses; that is, a foundation was created for an intensification of the industry.

The bases were developed for large-scale socialist livestock farming, for providing a rapid qualitative transformation of large masses of non-purebred cattle, for systems of feeding and maintaining animals on large farms, and for the organization of labor and veterinary service.

Appraising at their true worth the achievements of Soviet zootechnological science, one cannot stop at what has been accomplished. Now, the chief problem is all-out acceleration of the development of livestock farming based on increased effectiveness of scientific research and rapid introduction of its results into production.

The general secretary of the CPSU Central Committee, Comrade M.S. Gorbachev, in a report to the June (1985) meeting of the CPSU Central Committee on problems of accelerating scientific and technical progress, stressed that we can and must receive a far better result from scientific research. It is necessary to regard the problems of science anew through the prism of the demands of time--demands for its decisive turning toward the needs of social production, and the demands of production towards science.

This is the demand of the party and the command of time to fully address the whole complex of sciences related to livestock farming.

Against the background of these demands, there should be an examination of the status and prospects for those basic trends in science that will determine the high rates of intensification in livestock farming.

In this industry, where the chief tools of production are animals, their qualitative improvement is the most important basis for intensification.

An effective system already has been developed for large-scale selection, into which the results of theoretical and applied research have been integrated, from population genetics to information science and cybernetics. The introduction of the system is ensuring acceleration in the rates of selection.

A very important stage was the creation of 23 selections centers for livestock farming, united into a single complex of a genetics laboratory and pure-strain farms. Programs are being widely introduced for the Holsteinization of milk cattle and hybridization of swine.

At the same time, it is necessary to accelerate many times the rates of selection, to create strains and herds combining a high level of genetic potential for productivity with a suitability for strictly programmed industrial technology and resistance to disease and extreme environmental conditions.

The solution of these problems requires from researchers rapid mastery and application of the newest research methods along with the utilization of traditional means. First of all, this means wide use of methods for modeling selection processes; here we have a definite job to do and its all-out development is necessary.

All selectioners--both theoreticians and practitioners--should ideally master mathematical methods and computers; without this, effective conduct of selection is inconceivable. And this problem should be clearly stated in special-purpose programs.

Attention especially should be given to new biotechnological methods which are beginning to be used as an instrument for improving traditional breeding methods.

At present, the possibility has been shown in principle for introducing certain genes into an animal genotype, determining the development of the most economically valuable traits. It is widely known, for example, that genes which determine the production of growth hormones have already introduced in

laboratory animals and have ensured future generations with live-weight double the average norm. Of course, a large amount of work remains here, but it should begin immediately.

Cell engineering methods are acquiring important significance in solving the problem of accelerating selection processes. Also, the transplanting of embryos is becoming increasingly widespread as well as their division for the purpose of obtaining genetic copies, production of chimeras, and fuller use of supplies of ovocytes by developing means for their maturation and fertilization in vitro, and other things.

Research on gene and cell engineering is characterized by significant complexity. Evidence of this is the fact that the most simple of these methods, the transplanting of embryos, has met with difficulty in many of our institutes. And what is really to be said about the more complex research in prospect? Therefore, leaders of institutes should immediately undertake the mastery of these methods. Otherwise, we will be doomed to falling behind and will not provide the basis for the intensification of livestock farming.

The most important condition for the intensification of the industry is to ensure the realization of the genetic potential for productivity already created, which, at the contemporary stage, is basically tied to livestock feeding.

It should be noted that research over many years by physiologists, biochemists and specialists in the feeding of animals has mastered to a significant degree the requirements of all species of agricultural animals for many nourishing and biologically active substances, and there is sufficiently broad scientific information on types of feed for animals in a cross section of various natural and economic regions; this has created conditions for the organization of optimal feeding and, consequently, for the realization of productive potential. However, the problems posed above require a sharp acceleration of research, raising it to a higher scientific and methodological level, and also the solution of a number of new problems.

At the present time the most urgent problems are those relating to feeding highly productive animals and to developing methods for influencing reproductive functions and product quality through feeding. This research is being conducted in insufficient volume, but it is extremely important for production under the conditions of intensification. It is necessary to strengthen research on protein and mineral metabolism and on other problems. Here, for example, is one of them. Analysis has shown that, in the structure of livestock farming products, the most valuable component--protein--constitutes only 44.6 percent; the rest is basically fat. Twice the amount of food substances go to the synthesis of fat. Therefore, scientific collectives in the field of digestion and feeding of animals should expand research on problems of protein synthesis and the growth of muscle tissue and the mechanism for fat formation and should create feeding systems directed toward maximal increase in production of protein. Solution of this problem will, with more economical expenditure of feed, increase the share of more valuable products.

The rapid development of biotechnology in the world, which has made possible a leap forward in the study of the genetics of microorganisms, has brought to

the forefront the problem of studying relationships between microecological systems of the gastrointestinal tract, digestive processes, and the organisms of the host animal as a whole. It is already known that a large role is played by microbic associations of the gastro-intestinal tract both of ruminants and monogastric animals in the synthesis of enzymes and vitamins and in the transformation of cellulose--this very multitonnage feed component being produced in the plant growing industry.

It should be stated directly that we lag in the study of these most important aspects of animal feeding and, consequently, in the development of a system of full-value feeding with an economical expenditure of grain feed. Bulky feeds with a high cellulose content serve as a substitute for grain, but it is possible to raise sharply the level of its transformation in the organism only when microbiological processes have been activated in the rumens.

There is also another task in prospect--using the achievements of genetic engineering and, in general, the selection of microorganisms--to optimize the microecological system of the gastro-intestinal tract, having met the requirements for a number of irreplaceable nutritional factors.

In a word, without solving these problems, it is not possible to have rapid improvement in the system of feeding under conditions of the intensification of livestock farming. The expansion of this research, nontraditional for the network of zootechnical scientific institutions, requires large efforts both in training personnel and in supplying the needed equipment. But such a qualitative leap is necessary, lest science not solve the tasks placed before it.

At the present stage of the country's livestock farming development, the chief factor hindering the growth in livestock productivity is the weakness of the feed base and its lack of correspondence to the genetic potential for productivity that has already been created. In a majority of the branches of livestock farming, it is noted that the feed level is insufficient and that the rations of the most important nutritional substances (chiefly, protein and lysine) are not in balance, although the needs of animals for these substances has been well established. This imbalance leads to a lowering of productivity, overexpenditure of feed, especially grain, and this puts pressure on the country's grain balance. The structure of the production of products of livestock farming in the country is shaping up as follows: 74.2 percent of the protein and 60.6 percent of the fat are provided by cattle and sheep raising--that is, the branches where the feed base is bulky.

Meanwhile, the rates of growth of the production of these feeds have been insufficient over a period of many years. Full use is also far from being made of our unique national resources--areas of natural haymaking and pastures--which are a great source of high quality feeds and full value protein.

The significant overexpenditure of grain feeds is related to the non-optimal structure of grain forage production, characterized by a sharp deficit of protein and, especially, lysine. This is what is leading to a huge expenditure of grain in swine farming, which is reaching 9 feed units per kilogram of growth in live weight. It is necessary, along with the outstripping rates of

growth in the production of bulky feeds, to increase sharply the share of leguminous and oilbearing crops and leguminous grasses of long standing. If this does not happen, the achievement of planned levels of production for livestock farming products will cause future overexpenditure of grain.

Analysis, conducted with contemporary methods using computers, has shown that the sharpness of the deficit in feeds, protein, and lysine varies within broad limits in various regions and oblasts. In some of them the provision of feed protein is lower than the minimum. Thus, on farms in 22 percent of the oblasts, the protein content per feed unit is under 95 grams, but in 6 percent of the oblasts it is under 90 grams. It is obvious that such a level of rations with protein fully blocks the intensification of livestock farming and dooms the industry to low productivity, to overexpenditure of feeds, and to a regime of extensive development.

In this connection, researchers in the field of feed production are faced with a new, very important problem--the creation of a scientific basis for the intensification of the industry. This refers both to the problem of selection and to the whole complex of questions on the technology of feed production.

Simultaneously with the development of traditional feed base for livestock farming, there is also a need for accelerated rates of increase in the production of feed products from the microbiological industry (full-value proteins, irreplaceable amino acids, enzymes, vitamins, and antibiotics).

Greater efforts should be concentrated on the solution of these problems, with the enlistment of researchers of the USSR Academy of Sciences and with broad introduction of the most up-to-date methods of biotechnology.

The lack of balance between the already created genetic potential of domestically bred strains and the feed base is the chief obstacle to the intensification of livestock farming. Therefore, it is necessary to stabilize the population of basic species of agricultural animals, which will, with the growth in production of feeds, permit improvement in feeding and, consequently, the productivity of livestock.

The most important component of the system for intensive livestock farming is technology for the production of products. It must, first of all, ensure the realization of the genetic potential of livestock productivity with economical expenditure of live labor. Technological research in the industry has been strengthened especially since the early 1970's. On the basis of experiments and generalization of advanced experience, a number of up-to-date industrial technologies were developed for the production of the most important products of livestock farming, and a definite leap forward was made in introducing these technologies into production. Practically all poultry farming was put on an up-to-date technological basis, 35.2 percent of the pork is produced at up-to-date complexes, and highly mechanized farms provide 6.3 percent of the milk and 9.3 percent of the beef. At the same time, a higher level of productivity has been achieved and expenditure of labor has been reduced in the production of beef to 5/22 of its previous level, pork to 5/17 of its previous level, and milk by 36 percent. However, at these enterprises the genetic potential of the livestock and the application of technology are not providing a full pay-off, and combined efforts of researchers, planners, and

producers are needed. This must be done immediately; there is no time to be lost.

Large amounts of funds have been invested in livestock farming. During the period from 1971 to 1985, capital investments rose by a factor of 6, and in energy installation on farms by a factor of 4.

At the same time, increase in the average annual level of large-scale mechanization made up 3 percent in all, and lowering of labor expenditure has been one-half the rates of growth in capital investment. Consequently, as the result of the lack of the integrated approach, huge funds do not pay off. Here is a large field of activity for researchers in the field of mechanizing the processes of livestock farming. Systems of machines should be optimized and put into operation.

The major problem for mechanical researchers is the creation of mechanisms and equipment that fully responds to the physiological parameters of animals. Only then will both the technical and genetic potential of the industry be optimally utilized.

An important trend in research is the creation of technical systems that ensure individualization of animal maintenance and constant control over their condition, productivity, and needs.

Such technologies can function only with the creation of systems for the collection, processing, and analysis of large volumes of information on the condition of livestock. Prototypes of such systems have been created already and function on dairy farms in a number of developed countries. Work is already being conducted here, particularly at the Estonian Agricultural Academy, and the level is sufficiently high, although it is also being done by a very small scientific collective. As a whole, this laboratory can be an example of high-level effectiveness in research with an economical expenditure of efforts and means.

Other leading zootechnical institutions meanwhile have not expanded this research in sufficient measure. Moreover, some of them are occupied with insignificant improvements in already existing technology, increasing the number of essentially identical projects. Processes of economizing on materials and energy are acquiring ever increasing significance in the development of technologies. But now, industrial technologies for the production of products from livestock farming are both material consuming and energy wasting. And here are fruitful ideas that need realization.

There exist huge unexploited reserves. It is generally known, for example, that about 40 percent of all energy in feeds is transformed and released in the form of heat during the process of the vital activities of the animals. And this is equivalent to 91 million metric tons of conventional fuel. Even if part of this energy is used just in the winter indoor maintenance period, then this is a large reserve. Meanwhile, the heat product of the animals with usual ventilating systems is lost irretrievably. Already, technical solutions exist in principle which save energy of heat production for the support of an optimal microclimate with the utilization of ventilation wastes and accumulated soil warmth, the use of which permits fully abandoning the expenditure

of fuel in southern and central areas and reduces it in northern areas to 40 percent of what it was.

Pertinent to this problem is the use of manure to produce methane and valuable organic fertilizer. Considering the severe climatic conditions of a number of zones of the country, the development of energy-saving technologies based on this principle acquires serious economic significance and it is necessary to begin its active development. This principle also calls for the creation of farms with reduced materials consumption.

The intensification of livestock farming is closely tied to the problem of environmental protection. This problem has become especially acute in recent years with the establishment of large complexes with high concentrations of livestock.

In prospect is the development of technologies that would provide high-quality organic fertilizers under conditions of reliable protection of the environment from pollution. Here, there are both traditional solutions and a number of new ideas. Of special interest is the technology for sewage treatment in a system of biological ponds permitting the utilization of ecological-biological methods with minimal expenditures of energy while ensuring water treatment and producing food for fish. Such a complex has been developed and is functioning in Kostroma Oblast at the Kostromskoye inter-farm enterprise for swine reproduction and fattening. Research in this direction should be developed as much as possible on the basis of close cooperation among researchers of various specialties. This will have rapid results.

All new technological developments should provide for ensuring good conditions for livestock farming work. This is not just a technological problem but a large social problem as well. Its solution will permit reducing the deficit in work force in livestock farming and will attract young people to the industry.

For work on the farms, there is a need for those who know about personnel matters. Here, the chief tools of production are living subjects, with intensive metabolism, with established biological rhythms, the interruption of which leads to stresses, reducing productivity and disturbing to the health of the livestock. Therefore, high qualification and a conscientious attitude are the indispensable conditions for workers in intensive livestock farming. In this connection, it is necessary to expand significantly research on the creation of optimal systems for the organization of production under intensification conditions.

Conditions also need to be created so that people will be interested in fuller use not only of the biological potential of livestock but of the technical potential of the farms, and also in securing products of high quality with the least expenditures of feed, energy, and labor. At present, this very important research trend in the area of the specific economic structure is insufficiently developed and the outlook for it is not bright; it is necessary to adopt quick measures to strengthen this research, without which no other factors for intensification will be fully realized.

The intensification of livestock farming is unthinkable without reliable protection of livestock from disease. It must be remembered that without such protection, the frequency of sickness increases and the loss from diseases can be significant. In addition, it has been established that animals that have survived illnesses can never fully manifest their genetic potential for productivity. Highly productive livestock are characterized by a high rate of metabolism and a greater exactingness with respect to environmental factors.

Veterinary science has undoubted merit in developing and introducing reliable methods for diagnosis, prophylaxis, and treatment of animals and in the development of systems for protecting them from diseases under conditions of industrial technology. However, with intensive livestock farming, a number of new, and complex problems have arisen. Under conditions of high concentration of livestock, the character of many animal sicknesses has drastically changed. In place of acute epizootic diseases, against which our veterinary science has equipped livestock farmers, have come enzootic diseases, the inducers of which are conditionally pathogenic or even saprophytic microflora. Many traditional methods of fighting diseases under these conditions have been ineffective. Therefore, problems have appeared that are new in principle--the search for means to stimulate the whole immune system of the organism, the study of microbic ecology complexes, and the determination of precise criteria of resistance.

An important problem remains the introduction of scientific achievements into production. True, optimal variants of systems of introduction are already appearing. Thus, the establishment of clear conditions for the material encouragement of livestock farmers for selection achievements has sharply accelerated the breeding of highly productive lines; the creation of selection centers has shortened the route from the laboratories to the farms. A good example is the program for utilizing Holstein-Friesian cattle, which is being realized at rapid rates. The form of scientific-production associations also has proved itself and should be actively introduced.

While introducing scientific achievements into production, it is necessary to be oriented toward specific features of the developed systems for the conduct of livestock farming in individual republics, krais, and oblasts. In them has been concentrated everything basic that has been created by science and verified by advanced practice. All workers in the industry have been equipped with these documents. The problem is to make this theoretically effective mechanism for introduction into production start to work at full capacity. Analysis has shown that in those republics where systems for the conduct of livestock farming are being actively introduced, in the presence of other equal conditions, better indices and a higher level of intensity of production are being obtained. A graphic example is the Estonian SSR.

The introduction of scientific achievements into production undoubtedly will be furthered by clear goals and observance of the production technology of any product. Therefore, it is necessary to organize production so that it can be counted on for maximal utilization of natural, technical, scientific, and personnel potential.

At the present time, scientific collectives are actively working on a concept for the future development of livestock farming. It is based on a sharp

acceleration in scientific and technical progress, and putting in action all that science has already created but has not yet widely disseminated. To solve this problem, there must be a significant rise in labor productivity on the part of researchers, improvement in the coordination of scientific research, and concentration of large efforts on promising trends.

Many of the problems can be solved only through close cooperation between zoo-engineering research institutes and scientific institutions of the USSR Academy of Sciences and other agencies. Only in this event can the "conveyor belt"--discovery, applied development, and utilization in production--begin to work at full capacity.

Much remains to be done to improve the work of scientific research institutes and their contribution to strengthening the scientific and technical progress of the industry. Having solved these tasks, science will have made a heavy contribution to strengthening the country's economy and to raising the living standards of the Soviet people.

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LIVESTOCK

CALL FOR MORE EFFECTIVE BEEF CATTLE RAISING

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[Article by A. Cherekayev, academician All-Union Academy of Agricultural Sciences: "Developing Beef Cattle Raising"]

[Text] The direction taken in the country's agriculture of increasing milk production primarily through raising productivity of cows while keeping their number stable also requires a new approach to beef production. A close relationship exists between dairy and beef cattle raising. The higher the productivity of dairy cows, the lower their number for satisfying the need for milk and dairy products. But reduction of the number of dairy cows reduces beef production in dairy livestock raising. This is why satisfaction of the need for beef makes it absolutely necessary to breed animals of specialized beef breeds. This factor must be taken into account in long-range planning.

Beef cattle raising provides products of the highest quality with comparatively small outlays of labor and resources. What is particularly important is that this sector is distinguished as no other by low power intensiveness and makes it possible to produce meat without the use of exogenic, that is nonrenewable, energy obtained by man's labor. It would be useful in this connection to put in the proper section of Basic Directions "specialized" before the words "beef cattle raising."

This is all the more important for the reason that beef cattle raising continues to be one of the few sectors of agriculture which has been marking time for the past 20-25 years. We now have about 4 million head of beef cattle--roughly as many as in the '50s. And in some oblasts its size has even been reduced. Because of this, the country has a short fall of millions of tons of excellent beef.

One of the main reasons for such a situation is underestimation of specialization in this important sector. In some regions, they have started to milk beef cows in order to obtain from them both calves and milk. Such attempts on the scale of the country were twice undertaken earlier: toward the end of the '30s and during the period from 1953 to 1957. But each of them ended in failure. It turned out that under the conditions in which beef cattle are bred, cows of any genotype provide no more than 400-500 kilograms of commercial milk.

Milk production in the area of beef cattle raising is hindered by fodder and natural conditions. Rapidly drying grasses, onset of heat at the start of summer and blood-sucking insects bring on not only reduced milk yields but also premature stoppage of milk in the animals. As a result, lactation of beef cows lasts not more than 150-180 days.

But the main thing is that milking beef cows undermines the very roots of beef production. The suckling-milking method of growing calves sharply increases ailments and causes epizootics of young stock. At Ankatinskiy Sovkhoz in Uralskaya Oblast, for example, up to 40 percent of the calves died in some years and those which survived turned out to be underdeveloped and unsuitable for intensive rearing for beef.

It would seem that a severe lesson was taught. But it did not teach anything to some managers. Many farms began to milk beef cows in Chita Oblast. A number of beef sovkhozes in Kazakhstan had plans for production and sale of milk imposed on them. Even the leading breeding plants of beef stock--Ankatinskiy and Chapayevskiy--did not escape this fate.

Beef cattle raising can be conducted effectively only with precise observance of the technological principles of this sector. Two independent technological cycles exist in specialized beef cattle raising: reproduction and rearing of calves to the time of separation from cows; fattening of the produced young stocks. The biggest expenditures are required by the first technological cycles, known under the name of operation "cow--calf." Here about 20 fodder units are expended on each kilogram of weight increase, while the cost of the weight increase is usually 2.0-2.5-fold higher than in the rearing and fattening of the animals. The fact is that all outlays of feed, including on cows, which provide no other production, are charged to weight increases of calves. For this reason the operation "cow--calf" is almost always economically ineffective, while regular farms or animal-husbandry farms, specializing in the production of beef young stock, are unprofitable. At the same time, enterprises engaged in fattening (the second technological cycle) have unjustifiably high profits.

This is why it is necessary to solve in a special way organizational and economic questions. Farms raising beef cattle should operate as a rule on the principles of intrafarm specialization, where some animal-husbandry farms or divisions produce calves, others rear and fatten them. Were interfarm specialization to be employed here, as is the case in dairy cattle raising, the reproducer farms would always be in the red. And this undermines the very basis of the specialized beef sector.

The second technological operation has its own special features. The chief one here is to maximally utilize pastures and to use ably and on a wide scale pasture fattening of cattle wherein the cheapest weight increases are obtained. Unfortunately, in recent years, they have begun to forget pasture fattening even in regions of beef cattle raising through excessive infatuation with construction of various fattening complexes and areas.

It is very rightly stated in the draft of Basic Directions on the need to more fully utilize for the development of beef cattle raising natural fodder lands and to expand pasture fattening of cattle. The organization of pasture fattening, just like of cows, is an entire science with its own special features and fine points. This science has been quite fully developed by our specialists and scientists. Beef cattle raising can be converted into a highly efficient sector if we were to use intensive pasturing technology in which the principal portion of capital investment is allocated not for construction of expensive capital buildings but for the creation of highly productive year-around grazing lands.

It is most profitable to keep meat cattle on pasturages, fenced off with barbed wire. Specifically barbed rather than smooth, which the animals quickly break. The main purpose here is to boost labor productivity. It is possible to maintain animals in fenced-off areas without herdsmen. At Ankatinskiy Sovkhoz in the '70s, there were 300-400 cows with calves per worker. And this figure could be doubled. Such high labor productivity is one of the chief advantages of beef cattle raising, which can be successfully developed in regions with limited manpower resources.

Fencing off pastures is not a simple job. But well-made fences operate reliably for tens of years. However, the violation of any technological element results in them breaking down in the first 2-3 months. Specialists remember the boom raised several years ago concerning fencing off pastures. They were built on hundreds of thousands of hectares. But today one recalls them solely by protruding posts here and there with snips of wire. Due to violations of technology, funds in the millions were wasted.

At the same time, fencing of pasturages by itself makes it possible to regulate their grazing and on this basis to boost the productivity and the fodder capacity of the fields. By regulating the botanic composition of grass, it is possible to create fall and winter pasturages and to extend the pasturing period. Rich and interesting experience has been acquired in Chita Oblast where sowings of annual grasses are used for this. It is possible to select for this purpose such high-stalk plants as corn and Sudanese grass which are cut in the deep fall and left under the snow in double mows.

Under conditions of intensive pasture technology, there is no need to build capital buildings for maintenance of cattle during the stabling period. Animals of specialized beef breeds by the beginning of winter put on a uniform layer of fat and grow long thick hair, reliably protecting the organism from overcooling. It is possible to keep cows and repair young stock [remontnyy molodnyak] in any weather under roofing over deep nonremovable ground covering. The experience of the same Ankatinskiy Sovkhoz has proved the great effectiveness of such a method. Labor productivity of animal-husbandry workers in this way increases three-fourfold, the cost of a cattle place does not exceed 50-60 rubles. This is one-tenth that of present-day capital buildings and is 20-25-fold cheaper compared to the complexes recommended for beef cattle.

The erection of such roofs is an inexpensive undertaking and does not require scientific knowledge. In particular, the walls of such sheds should allow the

wind to blow through and the roof to retain warmth well. In the opposite case, during the first blizzard, roofs are packed with snow and it becomes impossible to keep the animals under them.

Unfortunately, under pressure of agricultural organs, many kolkhozes and sovkhozes raising beef stock started to build complexes comparable to the dairy ones. Even the leader of domestic beef cattle raising--Ankatinskiy Cattle Breeding Plant--started to build a complex for 1,200 cows. Fortunately, they thought it over and halted construction, throwing away hundreds of thousands of rubles. A cattle place in the complexes designed especially for beef cattle costs more than a thousand rubles. Their amortization and current maintenance is never reimbursed by production. It is not surprising that the cost of a quintal of weight gain at the same Ankatinskiy Sovkhoz has jumped from 60-70 rubles to 250-300 rubles and beef production has become unprofitable.

Under intensive pasturing technology, seasonal, best of all spring (April, May), calving is organized. Inasmuch as they occur on pastures, it is not necessary to build delivery sections and calf pens. At cheap pasture feeds and under favorable conditions, young stock grow rapidly and develop well. But the main thing is that seasonal calvings make it possible to separate calves before the onset of frosts and to leave the cows by themselves in breeding herds for the stabling period. If the seasonal character of calvings is upset, it becomes necessary to create calf pens for young stocks and warm buildings for their mothers. As a result, the effectiveness of pasturing technology is lost.

In specialized beef cattle raising, it is necessary to produce calves annually from each cow. Any case of barrenness reduces meat output and sharply boosts the production cost of beef. It is more difficult to set up reproduction of a herd in beef than in dairy cattle raising. Pasturing cows become get nervous, and it is difficult to separate them from the herd. The technology of artificial insemination of beef cows was developed and introduced at Ankatinskiy State Cattle Breeding Plant where output of young stock once exceeded 100 percent. This was possible to attain by using special cattle chutes).

The consideration of all these special features of specialized beef cattle raising is an essential condition for rapid development of this important sector and expansion on this basis of high-quality beef production.

7697

CSO: 1824/94

LIVESTOCK

LIVESTOCK SECTOR PROGRESS REVIEW

Moscow IZVESTIYA in Russian 23 Jan 86 p 1

[Article by O. Pavlov: "Our Livestock Farms in the Winter"]

[Text] Let us consider statistical data, which tell us about the livestock situation. All of us are interested in having matters in this agricultural sector proceed better and better. All the more so since the draft of Basic Directions designates a sharp, it could be said, turning point in the growth of meat production during the 12th Five-Year Plan. Is it really realistic? It is realistic! In the past 3 years, despite weather difficulties, production of beef and milk has steadily grown.

In 1984 compared to 1983, 4 percent more meat was produced and in 1985 compared to 1984--1 percent. But this percent--245,000 tons--is quite a hefty percent. In the future, however, it will be necessary to add more substantially. More specifically, to achieve a double increase.

Who worked how during the past year? Twelve union republics provided an increase in the sale of all kinds of livestock and poultry. Growth was from 2 to 7 percent on the kolkhozes and sovkhozes of the Ukraine, Belorussia, Azerbaijan, Georgia,, Lithuania, Moldavia, Latvia, Tajikistan, Armenia, Turkmenistan and Estonia. On farms of the RSFSR, growth was modest--0.8 percent.

The 1984 positions were given up, and appreciably at that, by farms of Uzbekistan, Kazakhstan and Kirghizia.

We know that 1984-1985 wintering of livestock was very difficult. But here you have a paradox which, it seems, should be interpreted by specialists of the USSR State Agroindustrial Committee and local Soviets. During the extremely strained winter months, meat sales proceeded well, milk production remained uneven (for the country as a whole), in some places at the level of the period of the year before. Approaching autumn and during autumn, results in animal husbandry were reassuring. The year was completed under extreme pressure. Hence only a 1 percent growth in meat sales. Moreover, 8 percent more feed was procured in autumn per standard head of cattle than in 1985. Furthermore, 3 percent more concentrates were bought from the state from 1 July 1985 to 1 January 1986. In a word, there was something in feed with

which to make meat. But at the end of the year--there was a drop in the sales rate. At the same time, the Russian Federation, for example, during the first 15 days of the new year increased by 24 percent deliveries of cattle compared to the 1985 level. Remember for last year the addition to 1984 amounted to 0.8 percent for the RSFSR. Milk is increasing, but this is not surprising--it just happens that improvements in the fodder base and a smoother flow of production are making themselves felt.

When it comes to meat, things are somewhat different. But first, many farms, having fulfilled the plan, in the last 10-day periods of the past year held on to cattle too long. Solely not to get a plan "from the attained level" and then live under tension the whole of the present 5-year period. But the plan is not just state discipline, it is also farm finances (more is paid for above-plan work). This means that the USSR State Agroindustrial Committee, whose specialists are now working on measures for improving the economic mechanism within the system, should take this situation into consideration. It is not painless for the economy. Hero of Socialist Labor A. Maystrenko, the director of Krasnoarmeyskiy Sovkhoz in Krasnodar Kray, reported, for example, that the obliged withholding cost the farm 100,000 rubles, and now meat combines are operating on three shifts and are unable to process in time the cattle pouring forth from the farms.

Now another thing--technological discipline. If, let us say, at a dairy farm production is counted every day, they keep track with different parameters the state of the animals and try to improve their diet, then chaos prevails more often than not during fattening. The (average daily) weight gain is recorded at long intervals of time. More often than not because of a shortage of scales and other apparatus on farms. Milkmaids, let us admit, know the special features of their cows: which animal should get what when and which animal has what kind of character. The operator in the fattening operation acts at times blindly: an animal specialist compiled the diet--and that's it. Consequently we do not have that many farms where fattening is organized on a scientific basis, on principles of best repayment of feed. This is why from the very beginning of the five-year plan, it is important for subdivisions of agroprom to concentrate on this work and to shift it to a new level.

In animal husbandry's dairy shop, while it operates smoothly, the rhythm of growth could also be higher. In 1985, the country's farms produced 1.1 million tons of milk more than in the previous year--102 percent. At the same time, it is interesting to see now this growth went. The first quarter (frigid wintering)--99.2 percent, the second--101 percent, the third and fourth--104 percent. As you see the most difficult were the first and second quarters (transition to summer maintenance). Thus this transition period is a kind of a crisis period from year to year. It would appear that the difficulties of wintering are behind, any moment now milk yield should climb, but it does not do so. It is thus also a problem for agroprom and needs to be solved.

At present many farms and rayons are reorganizing the type of feeding of dairy cattle. Reducing expenditure of concentrates, they give the animals more coarse and succulent fodder. But this must also be done ably. As, for example, at Verevo Association in Leningrad Oblast. Here without any increase

in the milking herd, they have boosted meat production volume by almost 40 percent in the past 5-year period. Average milk yield has grown from 3.343 to 4.275 kilograms. Then the question--what and how were they fed? In the composition of grass mixtures they expanded the area under leguminous crops--alfalfa, vetch and clover. Thanks to the change in the structure of the sowings, the yield of pasturages was increased, forage stocks for the winter period grew 1.5-fold.

But productivity is not stimulated by feed alone. The association's animal-husbandry workers have been engaged all these years in breeding work on improving the qualitative makeup of milking cattle. In recent years they have brought up the purebred state of the herd from 80 to 92 percent. The number of cows belonging to elite and elite-record classes has increased by almost one-third.

Here is another report that reached the editorial office.

Specialists of the Khmel'nitskiy Oblast Agroindustrial Complex succeeded in reducing grain outlays in making mixed feeds. According to their prescriptions, mass production was established of nutritive mixtures based on wastes of the food industry. The inclusion of such feeds in the diets of the animals boosted the herd's productivity. Introduction of an innovation is one of the stages in the accomplishment of the complex program operating in the oblast of reducing expenditures of grain resources for feed purposes. Such an approach to the matter will make it possible to save each year up to 50,000 tons of grain.

All these are good examples. But we must not be carried away by what has been achieved. The problems facing agroprom's animal-husbandry shop are very serious. And a decisive improvement is required in the technology of meat and milk production and boosting the skill of people and flexible material and moral incentives for their work.

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LIVESTOCK

OMSK OBLAST CATTLE FEEDING, WEIGHT LAG EXAMINED

Moscow SELSKAYA ZHIZN in Russian 22 Jan 86 p 1

[Article by M. Silvanovich, SELSKAYA ZHIZN correspondent, and V. Morozova, correspondent for USSR Gosteleradio [State Committee on Television and Radio Broadcasting of the USSR Council of Ministers], Omsk Oblast, under the rubric "Winter on Farms": "Fattening Without Weight Gain: Joint Raid by SELSKAYA ZHIZN AND All-Union Radio"]

[Text] At first glance the meat shop of Omsk Oblast is developing with stability and the production and sale of its products to the state are increasing. But here is what a simple analysis of the sources of this growth reveal--whereas poultry farmers increased meat sales from 21,000 to 31,000 tons during the 11th Five-Year Plan, and hog farmers--from 44,000 to 55,000 tons, the situation involving beef is worse. Here lags of 11 percent as compared to the levels of the 10th Five-Year Plan have been tolerated as concerns the sale of cattle, and the final year was worse than the first year by 10 percent. As a result, both the five-year and the annual plans for the sale of meat were not fulfilled by the oblast.

At the report-election party conference that took place late last week in Omsk it was noted that beef production has become the most problematic area within oblast agriculture. Several days before that we had a conversation about this lag in oblast institute stations and with directors of rayon agroindustrial associations and specialists of enterprises. Our collocutors willingly gave us the addresses of places where good indicators have been achieved, but avoided an analysis of the reasons for lags concealed in the pile of "objective" reasons.

Incidentally, we must say a few words about objective reasons. There are truly many of them. Three of the 5 years were unproductive, but cattle farms, in contrast to poultry factories and hogbreeding complexes, have had to rely completely on their own rations; moreover the proportion of concentrates in the rations had to be decreased sharply. But the fact that significantly fewer resources were invested in livestock raising than in poultry raising or hogbreeding had a much greater effect than the bad weather.

All enterprises are striving to raise the delivery weight of cattle, and this is proper. But they achieve this not by intensive fattening of calves but by

extending the period for fattening them. It is one thing to foresee a regimen in which an animal of 1.5 years of age weighs 400 kilograms and something completely different when after the suckling period a young bull is placed on hold, as if it were in a zootechnical storage unit, and remains that way on a semi-starvation ration until it is time for him to be delivered for slaughter. The animal is lucky if farmers find it necessary to improve the nutritional state of the animal and to fatten it with a stronger ration at least during its last weeks.

Statistics show that in 1985 only four out of 10 young bulls were fattened. The difference in delivery weight between those which were and others equalled 40-50 kilograms. The figure is a miserable one, why not admit it--"intensive" fattening turns out to be not too intensive. But if all 340,000 head of cattle delivered to the meat combine went through at least this type of fattening program, beef production would increase by almost 8,000 tons in live weight.

However, this did not happen. As a result, the average weight of cattle delivered to the meat combine equalled only 368 kilograms, and average daily weight gain--385 grams. This means that young bulls are kept in enterprises for an average of 900 days, or 30 months! All this time animals use up feeds to no purpose.

The directors of the oblast agroprom [Agroindustrial association] assured us that beginning last year it has ceased oppressing sovkhoses and kolkhoses with plans on herd "output." So what is interfering with more intensive turnover? In our opinion, this is due to economic immaturity and poor technological discipline. Only 23 percent of animals being raised for meat purposes are assigned to contract collectives. There are even fewer cost-accounting subdivisions here. The inclination toward a quiet life that has appeared in some workers has also had an effect. Even the obligations of leading collectives called for average daily weight gains of 500-550 grams, which immediately encouraged livestock farmers toward extensive management.

The large quantity of livestock slaughtered directly in sovkhoses and kolkhoses and used for intraenterprise needs also cuts sharply into meat resources. The misfortune is that primarily low-weight young animals find themselves under the knife--the average weight of animals slaughtered in enterprises was 235 kilograms, and in rayons such as Poltavskiy, Russko-Polyanskiy and Tavricheskiy--less than 200 kilograms.

During the last five-year plan the oblast seriously intended to make a breakthrough in beef production. Judging by the pages of the local press and by television and radio broadcasts, competition is in full swing on farms for the sale of 140,000 tons of cattle to the state annually. Under vitally creative conditions the Boyevoye OPKh [Experimental model farm] was characterized by a noteworthy experience. Without large capital investments, using the building materials at hand and cowsheds that had exceeded their usefulness, the OPKh created a fattening farm for almost 1,000 young bulls. The farm was entrusted to a brigade that consisted of five cowmen, headed by Nikolay Kudrey. The animals are maintained on the meat farm by free-grazing and untethered stall upkeep. The technological secret of the success of such

a complex is related to the stalls. Animals may move freely from facilities to open lots and approach feeders and water troughs with heated water. But the most important thing is that each animal has a stall with warm bedding.

We have seen many meat farms with untethered upkeep. But if stalls are not available the animals are crowded together; they become more active and their rest period is curtailed. A great deal of feed is consumed to no purpose. The situation is different here. An important detail, which was discussed by the enterprise's director, V. N. Smirnov, and by the senior zootechnologist, V. N. Shevchenko, was that a quintal of weight gain cost more than 105 rubles.

The experience of Boyevoye OPKh has been widely copied in the oblast, again under the banner of competition for the sale to the state of 140,000 tons of beef. Similar facilities now exist in 200 kolkhozes and sovkhozes, and in Isilkulskiy Rayon there are 32 of them. But during the second half of last year competition began to abate--newspapers, television and radio ceased to mention it any more. The plan for meat sales was fulfilled by the oblast's enterprises during the first, second and third quarters, but in the fourth and final quarter these results were reduced to nothing. In the course of the year 125,000 tons of beef were sold--15,000 tons less than planned.

The debt could have been much smaller. But concern about the fulfillment of the plan at the end of last year would have sealed off resources for the current year. In some enterprises a decision was evidently made to wait it out so as to demonstrate "a rapid pace" now from the very first. In half of January alone industry received, for processing, about 23,000 head of cattle with an average weight of 407 kilograms. The start has been simply magnificent, but it has been achieved by the unfulfillment of last year's assignments.

In the zone that is served by Kalachinskiy Meat Combine not one of the five rayons--Gorkovskiy, Kalachinskiy, Kormilovskiy, Nizhneomskiy and Okonezhnikovskiy--fulfilled last year's plan.

"In December," said the director of the combine, L. G. Timofeyeva, "we even telephoned enterprises--help us, bring your livestock, we are standing idle! But even the hogbreeding complex in Sovkhoz imeni Kuybyshev, where the technology does not tolerate holdovers, stopped its conveyor. After the new year we had to accept 1,600 hogs from it. In the entire month of December we produced 500 tons of meat products, and in the first 10 days of January--718 tons."

It would be interesting to know if the advocates of the victorious reports have calculated what their "tactics" have cost the enterprise and the state, how much feed and manpower, already in short supply, were expended in vain and how this will affect the organization of intensive fattening next year.

8228

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REGIONAL DEVELOPMENT

NEW METHOD OF CALCULATING SOIL NUTRIENT BALANCE PROPOSED

Minsk SELSKAYA GAZETA in Russian 11 Jan 85 p 2

[Article by V. Rylushkin, head of a laboratory of the Polesk Agricultural Experimental Station, candidate of agricultural sciences: "Not Simple Secrets of the Balance"]

[Text] For agronomists, agrochemists, scientists and production workers humus in the arable layer is one of the main indicators in the qualitative evaluation of soil, degree of its cultivation and fertility level. The more it is accumulated in soil, the higher its agrochemical and agrophysical properties; consequently, the higher the harvest and the return of mineral fertilizers.

Soil inspection data show that the humus content in the republic's sandy soil ranges within 0.7-1.3 percent, in sandy loam soil, 0.9 to 1.8 percent and in loamy soil, 1.2 to 2.0 percent. Individual plots of arable land and, on the whole, the soil of farms, which receive high doses of organic fertilizers for a long period, are an exception. Hence it is clear that we have potentials to further increase harvests of agricultural crops.

The first problem, which can be formulated as follows, appears here: What level of the humus content should be taken as the optimum? At first glance this question is the most ordinary. But let us turn to facts.

Research by the Belorussian Scientific Research Institute of Soil Science and Agrochemistry has established that in cultivated soddy-podzolic sandy soil the humus content comprises 1.6 to 2.0 percent, in sandy loam soil, 1.8 to 2.0 percent and in loamy soil, 2.0 to 2.2 percent.

In 1980 oblast chemicalization stations completed the fourth round of agrochemical soil inspection in the republic. Soil with a humus content of less than 1.5 percent was classified with low-provided soil, of 1.51 to 2.0, percent, with medium-provided soil, of 2.01 to 2.5 percent, with increasingly provided soil and of more than 2.51 percent, with highly provided soil. As we see, agrochemical inspection data are not adequate to the results of the scientific classification concerning the humus content depending on the soil texture.

From this discrepancy it must be concluded that in many cases the results of the agrochemical soil inspection on kolkhozes and state farms do not reflect the objective humus content and the degree of soil cultivation. For example, according to agrochemical inspection data in Narovlyanskiy Rayon, where on 23,500 hectares of arable land there are 15,100 hectares of sandy soil and 8,100 hectares of sandy loamy soil, on the average, the humus content in the arable soil layer is 2.04 percent, that is, soil is cultivated?! There is an even greater discrepancy in the data on the Partizanskiy Sovkhoz in the same rayon. A total of 2,200 out of 2,400 hectares of arable land are sandy soil and the weighted mean humus content is 2.29 percent! The picture in Mozyrskiy Rayon is similar. According to inspection data, the soil on the Kamenka Sovkhoz contains more humus than the soil on the Rodina Kolkhoz, although on the former farm the proportion of sandy soil is much greater than on the latter. Many such examples can be cited.

On the basis of the parameters established by scientific institutions for cultivated soil and the inspection data of the chemicalization station, according to the humus content the soil of the Partizanskiy Sovkhoz in Narovlyanskiy Rayon and of the Kamenka Sovkhoz in Mozyrskiy Rayon can be classified with medium- and well-cultivated soil. However, harvests point to the opposite. Moreover, the volumes of the procurement and application of organic fertilizers to soil on these farms were much lower than those recommended for ensuring a positive humus balance in soil.

In connection with this a question arises as to the objectivity of data of the agrochemical soil inspection for the humus content and of the correctness of the chosen method of determining the humus content in soil by laboratories for mass analyses of oblast chemicalization stations.

In our opinion, the basic error lies in the following. It is well known that after the application of peat in pure form, or in a mixture with manure, to soil peat residues are accumulated in it. They are mineralized very slowly and create an external semblance of humus accumulation and soil cultivation. At the same time, the data of field experiments conducted at many scientific institutions, including at the Polesk Agricultural Experimental Station, show that the application of peat to soil in pure form is not very effective, but during chemical analyses peat gives overstated data on the humus content in soil.

Thus, the data of agrochemical cartograms on the humus content cannot be considered objectively reflecting the humus content and the change in soil fertility. Their information content is minimal and does not recover the expenditures invested in this work. Apparently, there should be no separate methods of determining humus for mass laboratories of chemicalization stations and for scientific laboratories. There is a need for a single method of determining humus for specific types of soil, or for a qualitatively different approach to the evaluation of the content of the organic substance in soil. Only in this case will there be no question as to what level of the humus content in soil should be considered optimal and no double parameters of the optimum: one for science and another for production.

Organic fertilizers are some of the basic sources of expanded humus reproduction in soil and means of increasing its fertility. There are many examples showing that success in the advance of the farm economy comes primarily to those who begin work with an improvement in the basic means of production, that is, land, and with a scientific approach to the application of fertilizers, primarily organic ones. The "bread of land"--this is how vividly and aptly V. A. Ralko, chairman of the Osnezhitskiy Kolkhoz in Pinskiy Rayon, twice Hero of Socialist Labor, called manure. It must be admitted that we do not always use the "bread of land" skillfully and make it work for the harvest and for an increase in soil fertility. Therefore, although on a number of farms organic fertilizers have been procured for a long time and in large quantities, soil fertility and the yield of agricultural crops are growing slowly.

There are problems here, which are not sufficiently taken into consideration both in localities and by planning bodies, as a result of which soil fertility and the productivity of agricultural crops are not high. Let us turn to facts.

In order to ensure a stable increase in humus in soil, it is necessary to apply, depending on the structure of sown areas, the height of the harvest and the soil texture, from 12 to 30 tons of organic fertilizers per hectare of a crop rotation area. To ensure such a volume of procurement and application of organic fertilizers, it is necessary to have more than 150 head of cattle per 100 hectares of arable land, but by no means every farm keeps such a livestock population. Furthermore, the type of livestock keeping, provision with feed and bedding affect the manure yield. It has been estimated that, on the average, the yield of manure per head of cattle annually totals 7.6 tons with pasture and stable keeping and 13.3 tons, with stable keeping.

In its fertilizing value stable manure approximates the standard. Ten tons of it are equivalent to 12 tons of peat-manure compost, 37 tons of a peat-manure mixture and 45 tons of pure peat, that is, there are all kinds of tons.

Strict control and recording of the carting out of manure to fields have not been organized everywhere and not every cart with fertilizers is weighed. Moreover, the moisture of manure from various sections is different even on the same farm and all the more, within rayon boundaries. As yet there are no uniform requirements, standards, recalculation and reporting in the procurement and carting out of organic fertilizers. Hence in the chase after the fulfillment of the rayon report solid, semiliquid and at times liquid organic fertilizers are summed up in one column. Thus, not every ton gives the same effect in an increase in soil fertility.

At present there is an acute need for the development of tables and monograms for a recalculation of various types of organic fertilizers into a standard fertilizer, which should be used by all agricultural services, beginning with the weighing department of a farm and ending with planning bodies in a rayon and an oblast. Such an attempt has already been made. The explanation No 5-86 dated 26 April of the USSR Central Statistical Administration on recalculating liquid manure into standard bedding manure was issued in 1977.

However, this explanation, for all practical purposes, cannot be found anywhere now. Hence it turns out that on paper tons are one thing and the tons that work for the harvest, another.

Qualitative indicators of organic fertilizers, which depend not only on the types of livestock and its keeping, feed and bedding, but also on the conditions of their application, especially placement in soil, are also underestimated. Our calculations, for example, for Narovlyanskiy Rayon show that, to ensure an increase of 0.01 percent in humus in soil, it is necessary to apply, on the average, 15.4 tons of manure with a 0.45-percent content of nitrogen, or more than 22 tons with a 0.35-percent content, per hectare of arable land in the rayon. Therefore, the fight for the quality of organic fertilizers is the fight for saving material and energy expenditures, for increasing labor productivity in agriculture and for raising the yield and rates of soil cultivation.

However, manure is not the only source of replenishment of reserves of the organic substance in soil. There are also spropels, lignin, poultry excrements and composts from different types of waste, leaves and city garbage. However, all of them are of regional importance--near the places where they are obtained or prepared. And what is to be done with other farms?

We asked V. Sazonov, chairman of the Pramen Kastrychnika Kolkhoz in Mozyrskiy Rayon, a similar question. He also mentioned several ways. They are green fertilizers in the form of alternate, especially leguminous, crops. An expansion of their sown areas will make it possible to solve several problems, that is, to increase feed reserves and to accumulate more root and stubble residues, that is, raw materials for humus formation, in soil.

There is also another potential, which we customarily do not discuss. After grain crop harvesting, no matter how carefully combines are adjusted, up to 2 quintals of grain per hectare are lost. If immediately after winter crop harvesting the field is cleared of straw and disked and another quintal of grain is sown, on the one hand, good fall pastures and, on the other, a green fertilizer are created. On such plots the rates of humus mineralization during the fall period are lowered as compared with unsown plots. Such a method has been widely applied in the Polesk zone of the Ukraine.

There is also a second way, by which it is possible to judge the quantity of the organic substance in soil--balance calculations. Whereas the former way makes it possible to judge the changes in the content of the organic substance in soil on the basis of chemical analysis data, that is, it goes from soil to the plant, the second goes from the plant to soil. Balance calculations include data on plant residues obtained on the basis of direct calculations, or by means of mathematical computations according to regression equations. They take into consideration the height of the harvest, the crop, data on applied fertilizers and other indicators and make it possible to describe in quite an accurate manner how the raw material balance accumulates in soil for the formation of humus (positive or negative). However, balance calculations will not be able to give an answer as to the absolute change in the humus content in soil depending on the intensity of utilization of arable land.

It seems to us that the combination of two methods--direct determination of humus and balance calculations of accumulation of the organic substance--can give the fullest picture of a change in soil fertility and is the most informative. There are many problems here and their solution depends on a purposeful overall combination of the efforts of science and production. In the republic there are sufficient scientific personnel for their solution. However, research in this direction is dissipated. There is a need for special departments, laboratories and groups at experimental and oblast chemicalization stations, which in every oblast would handle problems concerning an increase in soil fertility and, first of all, the humus balance in soil.

11439

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REGIONAL DEVELOPMENT

EFFECTIVE SYSTEM OF ORGANIC FERTILIZER APPLICATION DEVELOPED

Minsk SELSKOYE KHOZYAYSTVO BELORUSSII in Russian No 6, Jun 85 pp 18-19

[Article by I. M. Bogdevich, director of the Belorussian Scientific Research Institute of Soil Science and Agrochemistry, candidate of agricultural sciences: "On the Basis of Strict Calculation"]

[Text] The last two decades were characterized by growing rates of fertilizer application on kolkhozes and sovkhozes. During that period the quantity of nutrients annually applied per hectare of arable land with organic and mineral fertilizers, on the average, increased from 140 to 350 kg and of lime, from 40 to 1,000. The output of all crops in feed units rose 2.2-fold respectively. The soil cultivation index increased 1.7-fold.

At present these rates have slowed down. Therefore, the principal attention of farmers should be directed toward an improvement in qualitative indicators, that is, increase in the return on expended nutrients, labor productivity growth and decrease in the expenditure of funds on the transportation, storage and application of fertilizers. The level of return per kg of applied mineral fertilizers is now the main criterion of evaluation of the fertilizer system. According to the results of 4 years of the 11th Five-Year Plan, it reached (on the average) 5.7 feed units per kg of NPK.

As the data of field experiments conducted at kolkhoz and sovkhoz fields in 1968-1983 show, mineral fertilizers applied in optimum doses can ensure the payment per kg of NPK with a high harvest--8 to 8.5 feed units--and during favorable years--up to 9 or 10 units. Progress and Iskra kolkhozes in Grodnenskiy Rayon, the Kolkhoz imeni Gastello in Minskiy Rayon, the Kommunar Kolkhoz in Kletskiy Rayon, the Leninskiy Put Kolkhoz in Slutskiy Rayon, the Politotdelets Kolkhoz in Lepelskiy Rayon, the Osnezhitskiy Kolkhoz in Pinskiy Rayon and others have attained such a return on mineral fertilizers for a long time. In 1984 a total of 243 farms obtained 8 feed units per kg of applied nutrients and more. At the same time, on 69 kolkhozes and sovkhozes in the republic the return on mineral fertilizers is twice as low (less than 4 kg). A broad program for an increase in soil fertility has been envisaged for the current five-year plan on every farm.

An increase in the provision of soil with the organic substance is its most important component, because more than one-half of the arable land in our

republic is characterized by a low (less than 2 percent) humus content. The data of experiments show that with favorable agrochemical properties of loamy soil and a high level of agrotechnology the productivity of grain-row crop rotations can increase to 4 percent of humus.

The application of 12 to 15 tons of high-quality organic fertilizers per hectare of mineral arable land on loamy and sandy soil bedded with moraine and of 18 to 20 tons on light loose sandy loam and sandy soil is effective for the bulk of farms. This is confirmed by the practical experience of 50 kolkhozes and sovkhozes in the republic. In 1984 they obtained more than 40 quintals of grain per hectare and the average productivity per hectare of arable land totaled 63.7 quintals of feed units. On the average, 21.3 tons of manure per hectare of arable land were applied on these farms. On farms, where 1 hectare of arable land received only 12.7 tons of organic fertilizers, the yield of grain crops amounted to 20 quintals and the total output of plant products, to 29.2 quintals of feed units.

On the whole, a stable positive humus balance in soil has been attained in the republic. During the years of the 11th Five-Year Plan, on the average, every hectare of arable land with fertilizers and root residues annually receives 0.3 to 0.6 tons of organic fertilizers more than they are mineralized during harvest formation. For example, in Belorussia in 1983 every hectare of arable land received more organic substances than in other republics--14.7 tons. However, a group of farms, where natural losses of the organic soil substance by mineralization are not compensated by applied fertilizers, can be found in every oblast.

For the purpose of attaining a general zero-deficit positive humus balance at the level of the republic, oblasts and rayons, a long-term goal-oriented overall program for the production and application of organic fertilizers for the period until the year 2000 has been developed. Similar programs have also been developed and are implemented successfully on many farms. However, every kolkhoz and sovkhoz should have them. For this the Belorussian Scientific Research Institute of Soil Science and Agrochemistry has developed a methodological instruction, which contains all the necessary standard data for planning and calculations.

The practical experience of the Leninskiy Put Kolkhoz in Slutskiy Rayon is an example of a highly efficient system of the production and application of organic fertilizers. A total of 35 to 37 tons of manure and composts per hectare of mineral arable land are applied here. This is due to the high density of livestock. Bedding manure and peat-manure composts with a 1:2 peat-manure ratio make up more than 80 percent of the 60,000 to 65,000 tons of annually procured fertilizers. Liquid and semiliquid manure is carted out to fields by mobile facilities according to direct-flow technology. Three concrete sites for 5,000 tons and four capital manure storage facilities for 23,000 tons of composts have been built for the preparation of composts and the storage of manure by the economic method. The losses of nutrients from manure have been reduced to a minimum.

One-half of the total quantity of fertilizers is applied during the summer-fall period to winter grain crops (20 to 30 tons per hectare) and early sown

crops of the following year--sugar beets and fodder root crops (up to 140 or 150 tons per hectare). The other half of manure and composts accumulated in fall is carted out in winter to fields into big piles of a volume of 400 to 500 tons in terms of 3 to 4 hectares and then is applied to row crops in spring. As a rule, spring grain crops utilize the aftereffect of manure.

During the first year of effect every ton of manure ensures a harvest increase of 28 to 29 feed units. However, a direct application of manure to spring grain crops is not advisable, because, according to the data of field experiments, in this case the fertilizer return is decreased by 30 percent as compared with the application of manure to winter crops and by 50 percent as compared with the application to row crops.

A mechanized "fertility detachment" performs all the operations connected with the procurement, storage and application of organic fertilizers. The wage system is dependent on the harvest. In order to eliminate losses of ammonium nitrogen, manure is immediately placed in soil. Therefore, every ruble of expenditures on the application of organic fertilizers is recovered with almost 3 rubles of net income. During the years of the 11th Five-Year Plan the content of the organic substance in soil increased from 1.65 to 2.47 percent, or by 22 tons per hectare of the arable layer. During the last 5 years the average annual rate of enrichment of soil with the organic substance is six times higher than, on the average, in the republic and three times higher than in Minsk Oblast.

The high background of organic fertilizers contributes to an increase in the return on mineral fertilizers. Every kilogram of nutrients gives an increase of 7 to 8.5 kg of grain and about 9 feed units of rotation crops. General final results are also impressive. In the last 15 years the productivity of arable land tripled and reached 74 quintals of feed units per hectare in 1984, the harvest of grain crops totaling 50.1 quintals.

A sufficient capacity of areas for the preparation and storage of composts established near sections is the foremost condition for an efficient system of organic fertilizers. On the Kolkhoz imeni Gastello in Minskiy Rayon 75,000 to 80,000 tons of bedding manure and composts are procured annually and the capacity of areas makes it possible to simultaneously store about 60,000 tons. The high technical equipment and labor organization enabled the kolkhoz to change over to a fundamentally new system of work with organic fertilizers. Manure and composts are stored only at sections in large piles of 7,000 to 10,000 tons during 5 to 7 months, which makes it possible to improve the quality and uniformity of the mass of fertilizers with minimal losses of the organic substance and nitrogen. During this period seeds of weedy plants lose their germination.

The system of a high-quality preparation of composts and keeping them until the stage of semidecomposed manure becomes ever more widespread in the republic. For example, on the Rassvet Kolkhoz in Lyubanskiy Rayon there is a permanent carryover reserve of 20,000 tons of composts, or 25 percent of their total quantity and, if needed, the period of composting on areas adjacent to sections reaches 1 year.

Optimum periods of application of organic fertilizers play an important role. For most farms this is as follows: 60 percent of the volume of fertilizer application in spring, 20 to 25 percent, to winter crops in summer and 25 to 30 percent, in fall. On the Kolkhoz imeni Gastello in Minskiy Rayon one-half of the manure is applied in summer and fall and the other half, in spring, without a double loading and piling in the field, but directly from areas adjacent to sections--by manure spreaders. The distance of hauls does not exceed 8 km. In spring manure is applied in 10 to 12 days.

The high quality of organic fertilizers at an average annual rate of application of 25 to 28 tons per hectare of arable land ensures a stable positive humus balance in soil. In the last 5 years its content has increased from 1.9 to 2.3 percent. Organic fertilizers account for more than 40 percent of the total amount of nutrients. Mineral fertilizers are applied in terms of 300 to 330 kg of the active substance per hectare of agricultural land with a return of 8 or 9 feed units per kg of mineral substances.

A highly effective application of mineral fertilizers is based on their sensible combination with organic fertilizers, differentiated doses and methods of application and a high agrotechnical level of crop cultivation.

The Kolkhoz imeni Gastello was the first to introduce a differentiated fertilizer system developed with the help of associates at the Belorussian Scientific Research Institute of Soil Science and Agrochemistry. As a result, at the end of the 10th Five-Year Plan the content of mobile forms of phosphorus and potassium in soil was at a level close to the optimum, a favorable soil reaction was attained everywhere and the productivity of arable land reached the level of about 60 quintals of feed units per hectare. Not only a detailed dosing of all types of fertilizers, but also the uniformity of their application over the area, is strictly observed here. For example, phosphoric and potassic fertilizers are applied in layers, that is, 60 percent of the rate to the plowed area and the remaining quantity, to the cultivated area across. Nitrogenous fertilizers are applied partially, in two or three stages with the utilization of the latest methods of plant diagnosis.

At present plans for the application of organic and mineral fertilizers containing differentiated doses for all field crops are developed by means of computers by the Main Computer Center of the Belorussian SSR Ministry of Agriculture according to the method of the Belorussian Scientific Research Institute of Soil Science and Agrochemistry for all the republic's farms. However, they are realized differently. On the Progress Kolkhoz in Grodnenskiy Rayon, the Kolkhoz imeni A. M. Voronetskiy in Berestovitskiy Rayon, the Osnezhitskiy Kolkhoz in Pinskiy Rayon and many others these plans are not only followed strictly, but are also creatively supplemented with due regard for the technological and varietal properties of the crops of a given farm.

Special attention must be paid to nitrogenous fertilizers. Plant diagnosis is an effective method, which makes it possible to efficiently determine the need for nitrogen topdressing and the optimum dose. The indicator for a rapid analysis and instructions for application have been sent to all farms. This will make it possible to increase the nitrogen content on plots poor in

nitrogen to N_{90-100} in spring crops and to $N_{120-150}$ in winter crops. The application of nitrogenous fertilizers in two stages is most effective: at the beginning of plant vegetation and in the shooting phase for winter crops and during cultivation and in the tillering phase for spring crops. On plots, where the total dose does not exceed 60 to 70 kg per hectare, split application is not advisable.

The entire stock of ammonium nitrate and ammonium sulfate must be utilized only for the topdressing of grain crops and perennial grass. It is better to apply carbamide to the basic dressing with a mandatory placement in soil. However, if there is a shortage of nitrate, it can be applied to the first topdressing on cohesive soil with subsequent harrowing. Urea is used for the second topdressing in the phase of tillering-beginning of shooting. It can also be applied jointly with retardants in a dose of no more than 20 kg of nitrogen for 200 to 250 liters of water per hectare in the shooting phase.

It is better to use liquid forms (anhydrous ammonia and ammonia water) for row and spring grain crops with the basic application on arable land in spring or late fall for the harvest of the following year.

An expansion of areas sown with leguminous crops is an important element of the fertilizer system ensuring an increase in soil fertility and strengthening of the feed base. This is graphically demonstrated by the experience of the Kolkhoz imeni A. M. Voronetskiy in Berestovitskiy Rayon, where highly productive sowings of clover, lucerne and pulse crops comprise 26 percent in the crop structure, which makes it possible to accumulate in soil more than 30 kg of nitrogen per hectare of arable land. This enables the kolkhoz to save more than 100 tons of nitrogenous mineral fertilizers and to allocate them for hayfields and pastures. A similar effective system of accumulation of inexpensive and ecologically safe biological nitrogen in soil is implemented on the Put k Kommunizmu Kolkhoz and on other farms in Grodnenskiy Rayon.

As agriculture intensifies, the need of plants for trace elements increases. According to preliminary research, more than 60 percent of the republic's soil is poorly provided with boron and copper and more than 80 percent, with molybdenum. A general large-scale mapping of soil for the content of trace elements will begin in 1986. Organic fertilizers are important sources of trace elements. As analyses and balance calculations performed on the Kolkhoz imeni A. M. Voronetskiy in Berestovitskiy Rayon have shown, 1 ton of manure and high-quality composts contains 2.2 grams of boron and about 3 grams of copper. Therefore, when 15 to 17 tons of organic fertilizers per hectare of arable land are applied, grain crops with a yield of 40 quintals and potatoes, of up to 300 quintals per hectare do not need the application of boric fertilizers.

On the Progress Kolkhoz in Grodnenskiy Rayon, where more than 20 tons of primarily bedding culmiferous manure per hectare of arable land are applied annually, grain crops with a yield of about 50 quintals and potatoes, of 300 to 350 quintals per hectare also do not require boric fertilizers.

However, areas sown with sugar beets, fodder root crops, clover, lucerne and fruit crops needed the application of boron in terms of 1 to 2 kg per hectare

on both farms. Flax and pulse crops need the application of boron in a dose of 0.4 to 0.8 kg per hectare. Double superphosphate with an addition of 0.4 percent of boron, or granulated boron superphosphate with an addition of 0.2 percent of boron, was the basic fertilizer. If there is a shortage of these fertilizers, the presowing treatment of seeds with a boric acid solution together with disinfection can be used. For this 20 to 40 grams of boric acid are dissolved in 1.0 to 1.5 liters of water per quintal of seeds for pulse crops and flax and 150 to 200 grams, for perennial grass and root crops.

Peat-bog and light mineral soil are poor in copper. Since they do not receive organic fertilizers, it is necessary to apply copper fertilizers to all crops in terms of 2 to 3 kg per hectare. On mineral soil without its dressing with organic substances copper fertilizers are needed only for flax, perennial grass and grain crops in doses of 1 to 2 kg.

An effective fertilizer system presupposes a periodic liming of soddy-podzolic soil. In the republic there are sufficient stocks of high-quality dolomitic pulverized meal to bring the soil reaction up to the optimum level on every farm. The indicator of soil acidity (pH in KCl) in crop rotations saturated with sugar beets, clover, lucerne, peas, wheat and barley should be maintained at the level of 6.5 to 7.0 and in crop rotations with flax, seed potatoes, oats, rye and lupin, within 5.5 to 6.0. This will make it possible to attain not only the maximum productivity per hectare of land areas, but also to ensure a high quality of agricultural products.

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REGIONAL DEVELOPMENT

MEASURES OF SOIL EROSION CONTROL IN BELORUSSIA

Minsk SELSKOYE KHOZYAYSTVO BELORUSSII in Russian No 10, Oct 85 pp 12-13

[Article by V. V. Zhilko, doctor of agricultural sciences: "Soil Protection and Harvest"]

[Text] Land with its soil cover occupies a special place among people's material living conditions, because this is the first prerequisite and the natural basis for any production and existence of man.

Science established that more than 1,000 years were needed for soil to be formed under the effect of natural vegetation, for reserves of humus, nitrogen, phosphorus, potassium and other elements of plant nutrition to be accumulated in it and for it to acquire properties ensuring a high fertility.

However, as a result of processes of erosion, soil is destroyed rapidly. Therefore, its protection, efficient utilization and improvement become the global problems of the present time, because destruction and degradation are the characteristic features of the increasing anthropogenic pressure on nature. This occurs owing to errors in man's economic activity, which are manifested in the physical destruction of the upper, most fertile horizons of land.

The problem of protection of soil against erosion is of great importance for our republic, because processes of erosion have become widespread. The total area of eroded and erosion-dangerous land exceeds 2 million hectares in the Belorussian SSR. About 2 mm of fertile land are washed out from steep slopes annually. This is approximately 50 tons per hectare; in 10 years, 2 cm and in 100 years, 20 cm. This shows that without appropriate soil protection measures soil is destroyed very rapidly. As a result, the most fertile humus horizon and nutrients are lost, the physical-water and agrochemical properties of soil deteriorate and the yield of agricultural crops and the quality of grown products are lowered.

Erosion can be prevented and the fertility of eroded land can be restored only through the implementation of a set of antierosion measures aimed at a fuller absorption of melt and rain water by soil, reduction of the water runoff and soil erosion and decrease in the wind velocity in the ground soil layer. The set of organizational, agrotechnical, meadow- and forest-reclamation and

hydrotechnical measures is reflected in the antierosion organization of the territory. In the republic the Belgiprozem Institute develops plans for land management with antierosion measures. By now all 1,442 farms (kolkhozes and state farms) have such plans.

The cultivation of spring and, especially, row crops under plain conditions and of grass and winter grain crops on slope land is the basis for the antierosion organization of the territory.

The set of agrotechnical antierosion measures includes appropriate methods of soil tillage, sowing, planting, cultivation, fertilizer application, regulation of snow melting and others. All of them are directed toward retaining rain at the place of its fall, or lowering the rate of the water runoff or the wind velocity in the ground layer.

Eroded soil is cultivated across the slope, or in a direction close to horizontals or diametrical to prevailing winds. Tillage with a simultaneous loosening of the subsurface horizon with plows with subsoil cultivating bodies or subsoil cultivators is an effective method of increasing moisture reserves in soil and reducing erosion.

Loosening without a furrow slice inversion with a retention on the soil surface of the mulch layer of stubble and plant residues (instead of fall plowing) is the most effective soil protective method for the control of water and wind erosion. Such cultivation reduces the erosion of the fertile layer and increases the harvest of cultivated crops. This is done by narrow-cut shovel sweeps designed by the Central Scientific Research Institute of Mechanization and Electrification of Agriculture of the USSR Nonchernozem Zone as detachable working elements for general-purpose plows. If there are no shovel sweeps, serially manufactured KCh-5,1 chisels can be used.

The thinning of subsurface soil layers by the method of deep slitting (about 50 cm) carried out in late fall on a fall-plowed field, perennial grass and areas sown with winter crops before the appearance of shoots is of great importance in the regulation of the air regime and control of erosion. Deep slitting across slopes prevents a surface runoff of water and fertilizers, formation of dew ponds and soaking of crops on plain plots in spring, levels out soil moisture according to slope elements, ensures moisture distribution among horizons and increases the yield by 10 to 20 percent.

Deep slitting is carried out by SchN-2-40 slitters or plows equipped with slitters designed by the Central Scientific Research Institute of Mechanization and Electrification of Agriculture of the USSR Nonchernozem Zone. Slitter-knives are installed on a PLN-5-35 mounted five-body plow instead of first or fifth bodies so that slits may extend along caterpillar tracks or tractor wheels.

To prevent washouts during a runoff of melt water along road tracks and open furrows, runoff sprayers are made on arable land and washouts are leveled. Usually, runoff sprayers are placed every 20 to 30 meters at an angle of 40 to 45°. They are made with a mounted plow, on which two medium-size bodies are left: the first is normal and the second has an increased moldboard. The

traction--a caterpillar tractor of a capacity of 2.2 kw. When water currents are 20 to 25 cm deep, sprayers are created by one plow operation. The ridge formed by the increased moldboard is compacted by the caterpillar when the tractor is in reverse.

Many erosion control measures are based on the utilization of the protective properties of the plants themselves, root residues, residues near roots or the products of their decomposition. To create a dense plant cover protecting soil well against a destruction, alternate crops are utilized. As a result, the field is covered with vegetation for a longer time, especially in spring and fall, during the most erosion-dangerous periods. During a very strong development of erosion perennial grass and lupins, especially perennial lupin, are utilized. Out of perennial grass lucerne protects soil well against erosion. On its sown areas there is hardly any erosion.

The application of organic and mineral fertilizers contributes to a better development of agricultural crops, as a result of which the surface water runoff is reduced and soil is less subject to destruction. After harvesting a large amount of plant residues remains in the arable horizon, which also increases the antierosion resistance. The application of higher doses of organic and mineral fertilizers, enrichment of soil with peat and expansion of the sowing of green manure crops increases the productivity of slope land.

All agricultural crops cultivated on eroded soddy-podzolic soil are very responsive to the application of nitrogenous fertilizers. The effectiveness of phosphoric fertilizers is determined to a significant degree by the content of mobile phosphates in soil and, usually, the increase from them is lower than from nitrogenous fertilizers. The application of potassic fertilizers on eroded soil is not very effective. On light soil the effectiveness from their application increases somewhat.

With the increase in soil erodibility the absorption of phosphorus and potassium rises and the upper soil layer dries up. This leads to a decrease in the mobility and availability of nutrients to plants. In order to reduce the possible losses of nutrients from fertilizers, they must be placed immediately after application at a depth of no less than 10 to 12 cm in combination with agrotechnical antierosion measures.

When planning the application of differentiated fertilizer doses, it is necessary to use plans for intrafarm land management with an antierosion organization of the territory and agrochemical cartograms. If areas permit, it is advisable to apply differentiated fertilizer rates depending on the degree of soil erodibility. However, owing to small contours, this does not always seem possible. In such cases fertilizer doses are differentiated according to land categories. On second-category land, where slightly eroded soil predominates, doses of nitrogenous fertilizers are increased by 10 to 20 percent; on third-category land with the predominance of medium-eroded soil, by 30 to 50 percent; on fourth-category land with severely eroded soil, by 50 to 100 percent. Doses of phosphoric-potassic fertilizers are determined in accordance with agrochemical categories.

On farms applying high doses of organic and mineral fertilizers (for example, 90 to 120 kg of nitrogen per hectare) there is no need for their differentiated application depending on soil erodibility.

Special soil protective rotations with perennial grass crops, which increase the absorption of precipitation and retain clay and mud particles washed out by the above-ground part, are of great importance in the control of soil erosion.

Soil protective crop rotations with three or four fields of perennial grass, excluding row crops, should be introduced on medium- and severely eroded soil and two crop rotation fields should be allocated for grass on slightly eroded soil.

Since each of the methods is in effect for a short time, they must be replaced systematically, protecting soil throughout the year.

Soil protective technologies of cultivation of agricultural crops, which are some of the basic links in soil protective farming, meet this most fully.

The Belorussian Scientific Research Institute of Soil Management and Agrochemistry and the Central Scientific Research Institute of Mechanization and Electrification of Agriculture of the USSR Nonchernozem Zone have developed soil protective technologies of cultivation of grain crops and potatoes on eroded soddy-podzolic light loamy soil and soil protective technology of cultivation of spring grain crops on peat-bog soil.

The essence of the soil protective technology of potato cultivation lies in the fact that stubble breaking with a BDT-3 heavy disk harrow equipped with flat wheel spiders at a depth of 8 to 10 cm is carried out in fall after the harvesting of grain and fodder crops. Wheel spiders are detachable working elements for BDT-type harrows. Soil scuffling should be carried out at an angle of battery attack of 20 to 26°. Harrows ensure a ridging of the field surface of no more than 6 cm. To eliminate the clogging of batteries with plant residues and to ensure a good quality of soil crumbling, disks are installed with the convex side of needles in the direction of rotation.

Two weeks after scuffling subsurface soil cultivation is carried out at the depth of the arable horizon by shovel sweeps--detachable working elements for PGP-7-40 and PLN-5-35 plows and others. Such soil cultivation ensures a good crumbling of the layer and a high degree (about 70 percent) of the preservation of stubble and aftermath residues on the surface.

As a result of soil scuffling and subsurface cultivation by such implements, aftermath plant residues are distributed evenly on the field surface and in the upper 10-cm layer, which ensures a good water absorbing and snow retaining capacity.

If a field is infested with perennial weeds (wheat-grass and so forth), after nonmoldboard loosening soil should be cultivated at the depth of 10 to 12 cm by a KPS-4 cultivator or a heavy harrow and wheel spiders according to the

bastard fallow system as weeds grow back. Soil cultivation (KPS-4 cultivator) with harrowing (BZSS-1 harrow) is carried out in spring. Organic and mineral fertilizers are applied to tillage.

Potatoes are planted along a slope with the creation of dams in furrows by the SN-4B potato planter equipped with cut-out covering disks. For this segmental cutouts of a trapezoid form are made at each of them. Such dams protect soil against erosion before the first interrow cultivation.

Potatoes in interrow spacings are cultivated by a KON-2,8 PM or a KRN-4,2G cultivator equipped with BRU-0,7M rotary needle harrows for weed control and with PPB-0,6A furrow interrupters, which are manufactured serially.

During spring snow melting soil essentially does not erode (0.10 tons per hectare). During the summer period erosion is approximately seven- to tenfold lower as compared with ordinary technology. The yield of potatoes increases by an average of 20 quintals per hectare.

With the soil protective technology of barley cultivation hole digging in the field surface by LDG-5 or LDG-10 hydraulically operated disk tillers reequipped by means of PLDG-5 and PLDG-10 attachments into hole diggers is carried out in fall after the harvesting and replotting of potatoes.

In spring after presowing soil cultivation by a KPS-4 cultivator with BZSS-1 harrows and mineral fertilizer application barley is sown with a SZU-3,6 seeder across a slope. With such field cultivation soil erosion in spring decreases to one-half. The yield of barley increases by 1.1 quintals per hectare as compared with ordinary technology.

Postsowing covering of grain crops with ring-crowfoot rollers, which create a rough surface lowering the wind velocity in the ground layer, is one of the effective methods of protecting drained peat-bog soil against deflation during spring and fall periods, when the field surface before the appearance of mass shoots is uncovered for a long time.

The application of soil protective technology during the cultivation of spring grain crops gives the greatest effect when in fall ordinary fall plowing is replaced with subsurface soil cultivation at the depth of the arable horizon with shovel sweeps designed by the Central Scientific Research Institute of Mechanization and Electrification of Agriculture of the USSR Nonchernozem Zone--detachable working elements for PGP-7 and PLN-5-35 plows and so forth.

In spring before sowing soil is tilled with a KPS-2 cultivator or a BIG-3 harrow. Sowing is carried out with a SZP-3,6 grain pressing seeder (which, at the same time, covers seeds in rows and creates a ridgy surface), or with an ordinary seeder with subsequent covering with ring-crowfoot rollers.

After the harvesting of stubble crops, where ordinary cultivation (moldboard plowing) and stubble breaking have been applied, in spring during the sowing of spring grain crops soil is cultivated with narrow-cut shovel sweeps for reducing deflation and undercutting germinated weeds.

If in crop rotation spring grain crops follow the basic crop, one- or twofold stubble breaking (with disks) is carried out for the purpose of weed control.

The application of soil protective technology of barley cultivation on peat-bog soil contributes to a smaller depletion of peat, increase in moisture reserves and prevention of soil deflation and increases the barley yield by 1.6 quintals per hectare as compared with ordinary technology. The indicated technology is also acceptable for other spring crops.

The study of the cultivation of eroded soddy-podzolic sandy soil through the application of organic fertilizers (against the background of NPK) and of the effectiveness of protection of soil against deflation showed that the maximum soil removal (about 2 tons per hectare) was observed in control (without the application of fertilizers) and in the variant with the application of mineral fertilizers. In variants with the application of peat in pure form the removal was one-half of that in control and in variants, where manure and peat-manure composts were applied, deflation was not observed. In these variants oat harvests were the biggest.

On deflated peat bogs it is very important to establish special crop rotations with perennial grass for a long-term use. In nine- or ten-field crop rotations of the meadow-pasture type grass should occupy five or six fields. Under such conditions on plots subject to a severe erosion the field period ranges from 2-3 to 5-6 years and the meadow period, from 3-4 to 5-6 years. The sowing of stubble crops is also envisaged during the field period.

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AGRO-ECONOMICS AND ORGANIZATION

CALCULATION, COLLECTION OF INCOME TAX ON KOLKHOZES DISCUSSED

Moscow FINANSY SSSR in Russian No 10, 1985 pp 29-31

[Article by N. M. Shpalov, senior economist of the State Revenues Administration, USSR Ministry of Finance: "Control of Finance Organs Over Calculation and Collection of Income Tax from Kolkhozes"]

[Text] The Soviet state shows constant concern for strengthening and developing the economy of kolkhozes and has put into practice a complex of measures for strengthening their economy and cost accounting as well as reinforcing material interest in increasing growth of production and improving its quality. Major assistance is provided to unprofitable and low-profit farms for the purpose of boosting their profitability. Since 1 January 1983, purchase prices have been raised for cattle, pigs, sheep, milk, grain, sugar beets, potatoes and other agricultural products. Purchase-price increases are paid for products sold to the state by low-profit and unprofitable kolkhozes. For this purpose, 6 billion rubles a year are allocated from the budget. Moreover, 3.3 billion rubles are assigned for the financing of planned expenditures of farms inadequately equipped with fixed capital and not possessing own funds for expanding reproduction. It goes into the construction of facilities of the cultural and personal-services type, utilities, intrafarm roads and for the maintenance of children's and educational institutions as well as for insurance payments.

Exercising control over the use of budget allocations, finance organs at the same time are obliged to verify the existence and correctness of formulation of budgetary documentation and on establishment of instances of nonspecified [netselevoye] use of capital, to discontinue their financing. It should be kept in mind that funds allotted from the budget for insurance payments are reflected in annual accounting as miscellaneous revenues and should be included in computation of the income tax.

Among previously adopted measures for holding personnel, additions were introduced in wages of tractor and machine operators and since 1 January 1983 increases for kolkhoz members employed in animal husbandry for uninterrupted length of service on one farm as well as for all persons working on kolkhozes in the RSFSR Nonchernozem Zone. In the course of verifying calculations, it is necessary to direct attention to correctness in accounting these additions in calculation of production cost and computation of income tax. It is also

necessary to verify correctness of the use of purchase prices and markups by procurement organizations.

The amount of income tax paid into the budget depends on the size of net income and level of profitability. According to legislation, in the computation of income tax according to differentiated rates, net income corresponding to a profitability of 25 percent is excluded from the amount of taxable net income included in the tax calculation.

On the basis of decisions of the May (1982) Plenum of the CPSU Central Committee, the manner of determining the tax rate in computation of the tax on the taxable net income was changed. Beginning with income for 1982, a tax is levied on each percent of profitability exceeding 25 percent in the amount of 0.1, 0.2, 0.4 and 0.5 percent, depending on the level of profitability, but not more than 25 percent of the taxable net income.

Together with this, the nontaxable minimum of the wage fund was raised from 60 to 70 rubles per month on the average per worker. This means that wages of kolkhoz farmers in the amount of 840 rubles per annum for a person are completely not subject to income tax.

Even in the first year following the May (1982) Plenum of the CPSU Central Committee, kolkhoz economy was markedly bolstered. Owing to growth of the production volume of agricultural products as well as a rise in purchase prices and payments of additions, monetary income (profit) from the sale of products and services on the side in 1983 grew by 17.8 billion rubles, or 28.6 percent, compared to 1982. Net income of kolkhozes for the country as a whole for 1983 amounted to 12.9 billion rubles. The number of farms with a profitability higher than 25 percent increased compared to 1982 from 11.9 to 44.4 percent of the total number. Whereas in 1982 unprofitable farms constituted about 49 percent, in 1983 the figure was only 8 percent of the total number of kolkhozes in the country. But not all the possibilities provided to kolkhozes have been utilized. And while in 1983 outlays per ruble of obtained revenue dropped by 15.6 percent compared to the previous year, production costs still constituted a significant relative share in the total volume of production.

In materials of the May (1982) Plenum of the CPSU Central Committee it was pointed out that the economic state of kolkhozes depends entirely on organization of management of the farm and the efforts of collectives of rural workers constantly aimed at improving agricultural production, increasing agricultural production and striving for economy and thrift.

In the reduction of production costs, nonproductive outlays and losses and in raising the profitability level, finance organs can and must provide kolkhozes a great deal of assistance. In exercising control over correctness of computation and collection of income tax, state-revenue economists must not restrict themselves solely to verification of the calculation on the annual return of a kolkhoz and determination of the average yearly number of workers. For purposes of correct and complete accounting of taxable income, they must pay more attention to questions of computing the cost of produced and sold

products as well as of helping kolkhozes to correctly and objectively perform accounting.

Under conditions of use of differentiated size of rates for computing the tax from net income as well as raising the nontaxable minimum in computing the income tax from the taxable wage fund (for 1983 income for the first time since 1965) the amount of the tax calculated by kolkhozes exceeded 1 billion rubles. But payments of income tax from taxable net income amounted to a small relative share--two-thirds of the total amount of the income tax for the said year was computed according to a rate of 8 percent of the taxable wage fund of kolkhoz farmers. The total amount of the income tax for 1984 from taxable net income and the wage fund of kolkhoz farmers was determined almost at the same level as in 1983.

In carrying out verification at kolkhozes, finance organs are obliged to strictly observe existing legislation, to timely and correctly collect payments owed the budget and to adopt measures for full return of occurred overpayments on the basis of declarations. In analysis of the correctness of compilation of tables of annual returns and tax calculations on the basis of documents and accounting data, it is necessary to verify completeness of accounting of the income of kolkhozes. Calculations should include all income of the reporting year from: sale of agricultural products and services on the side; sale of products of auxiliary enterprises and other physical assets (except for basic capital) as being entered in the form of profit on the accounts of kolkhozes as well as remaining indebtedness for purchasers.

The examiner should direct attention in the course of verification to the correctness and complete reflection of additions in purchases prices for products sold by unprofitable and low-profit farms, additions to kolkhozes for products sold to the state above the level attained during the 10th Five-Year Plan and supplementary payments for provision of transport and other services by procurement organizations in sales of products. It is necessary to verify the correctness and validity of including under increased profit other revenues or under reduction of its expenditures (losses) and to ascertain the cause of formation of nonproduction losses included under financial results.

In determination of expenditures (losses) and consequent shortage of products because of total or partial damage to sowings of agriculture crops and plantings, it should be kept in mind that in all cases the basis for this exists in acts of Gosstrakh organs drawn up in the prescribed manner and calculation of damage and insurance compensation in connection with destruction of or damage to agricultural crops (Form No 117a). If at the time of making a calculation, the taking in of the harvest is not completely finished for individual damaged crops, the size of product shortage is determined by taking into account full collection of the harvest according to the data of the annual report.

The size of the damage incurred by a farm in connection with destruction or damage to agricultural crops and plantings is compensated partially by Gosstrakh, that is, it does not fully cover losses due to the indicated reason. Consequently farms for the purpose of covering losses not compensated

by Gosstrakh have to allocate capital of the reserve fund which is taken into account in the annual return on Form No 2-skh on page 614 as other income.

Of major importance is correct calculation of the cost of produced products and services as well as those sold on the side. Comparison of annual-return tables with accounts of outlays and original documents establishes the reliability of determination of the cost of a product unit in the return. At the same time, special attention should be paid to proper distribution of production expenditures in sectors with several kinds of related or secondary products. The cost of last year's sold products should be calculated on the basis of the cost for the balance of this year and that of the reporting year according to the return of the current year.

In verification of the correctness of determination of the taxable wage fund of kolkhoz members, the total wage fund must be considered as not only an indicator for calculation of income tax but primarily as the principal element of production expenditures. Moreover, there should not be included under expenditures of basic production (plant growing and animal husbandry) expenditures for payment of labor covered by capital investment; from special funds from Account 87 (maintenance of kindergartens, nurseries, clubs, cultural and educational institutions and others); covered on the basis of distribution of net income, including payment of taxes and levies [sbory], share and membership dues and other. Together with this, it is necessary to correctly determine all payments included in the wage fund. In the taxable fund, aside from basic, supplementary payment and payment in kind, all additions and supplementary payments, including additions for production quality, bonuses for overfulfillment of production plan, extra pay for long service, economy of materials, safe care of equipment, accident-free work as well as other supplementary payments, bonuses and increases if they are included on the basis of the existing procedure of accounting in production costs or in the full cost of sold products. It should also be checked whether occasional wage payments or one-time payments according to individual orders and departments as a work payment have been included.

Sums of bonuses enumerated as net income are not considered in the taxable wage fund of kolkhoz farmers and production costs. In calculation of income tax, bonuses to supervisory personnel and specialists, payments by procurement organizations for sugar beet, sunflower and others are also not taken into account. A list of bonuses and payments not included in the wage fund of kolkhoz farmers is given in the instruction on filling out forms of the annual return of kolkhozes and in subsequent amendments to it.

In the course of document checks of tax calculations at kolkhozes, finance organs should more actively disclose and analyze the causes influencing growth of efficiency of agricultural production and work out jointly with agricultural organs proposals for reducing production cost and increasing production output. This will promote an increase in profitability of kolkhozes and consequently of the budget's revenues.

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AGRO-ECONOMICS AND ORGANIZATION

PRIVATE PLOT DEVELOPERS DISREGARD PUBLIC INTEREST

Moscow SELSKAYA ZHIZN in Russian 13 Dec 85 p 2

Article by V. Peregudov, machine operator at Zadonskiy Sovkhoz in Lipetsk Oblast: "This Is Not Income"; for response to this article published by SELSKAYA ZHIZN on 18 January 1986, see pages S1-S2 of the Soviet Union Daily Report FBIS-SOV-86-022 of 3 February 1986/

Text I am not in the least ashamed of my native village of Utkino. Pleasing to the eye, it appears spacious and large as it sprawls on the side of a hill. It is a large village that already numbers about 600 farmyards. The homes are all made of stone and around them and in them are everything that one needs. If all of the garages are opened, one sees as many vehicles as there are cows in the sovkhov herd. And if one leafs through the savings bankbooks...

It is good to have enough of everything. It must be this way. We are presently discussing the new draft reading for the CPSU Program, in which concern is evidenced in every line for the well-being of the future Soviet man. Should we not be pleased with this?

Yes, we all wish to live well. However, the concepts of happiness and well-being are complicated ones. Each individual interprets them differently. G.F. Tikhotskikh lives in Utkino. Five years ago he was the most celebrated individual in the village. As the best combine operator in the rayon, he was the pride of the sovkhov. Correspondents were always present during the harvest work, young pioneers brought him flowers, amateur artists honored him from the stage and I recall how the rayon party committee issued a leaflet which told the story of his work. He was issued a "Zhiguli" ahead of turn and he was also presented with awards and bonuses.

Tikhotskikh is no longer listed as a member of the sovkhov. This is not meant to imply that he has taken ill or accepted an early pension. Just as in the past, he continues to work in a diligent manner, only now he works in his own private garden rather than out on the sovkhov fields. A plastic sheet stretches from one fence to another as he works feverishly over his cucumber beds. He nurses and nurtures his crop for the market.

It was initially thought at the sovkhov that he had suffered a lapse and that he would soon return to his senses. They tried to convince him otherwise: "You are a born grain grower! Is it not possible for you to work at least 2-3

weeks during the harvest season? Yes and your wife could also provide assistance to the sovkhos." Tikhotskikh did not listen for long before angrily slamming shut the wicket gate: "We have enough work of our own to keep us busy" he said. Thus ended the discussion.

Need did not bring about the change in this individual -- what need could there have been? Here there was just the usual greed. Yes there was a burning passion to develop his well-being by himself, apart from others and in a manner so as not to have to share anything.

Money-box morals is a contagion of a rare type. I began by mentioning the rich villages which we have in Zadonskiy Rayon. At first one sees and is led to believe that a sovkhos here rakes in the profit. But one only has to visit the village and its yards in order to learn where the money comes from. Similar to lakes in the steppe regions, cucumbers glisten in the sun under a plastic cover.

And it can be stated directly that the sovkhos enriched neither itself nor the state. Although at one time it was a rather strong farm. Strangely enough, this was at a time when we thought very little about a rich life and when there were no such things as vacation periods or weekends off from work. And the wages received were miserly compared to today's wages. Later we began to live better and to earn greater wages and yet the work took a turn for the worse. It finally reached a point where, it is shameful to have to admit, straw had to be imported from Novosibirsk during the winter. Cows were milked in accordance with orders issued and the milk yield was raised to 1,400 kilograms. The grain yield was 5-10 quintals -- and this was from chernozem soil.

True, over the past 3 years, coincidental with the arrival of the new director, P.P. Ananyev, improvements have been realized in the farm operations. The crop and milk yields are increasing. But they are still not the crop and milk yields which we should be obtaining. We have fine land, sufficient equipment and large quantities of fertilizer. However, a chief concern is to whom all of these materials can be entrusted to. A tour of the Utkino area reveals the availability of 500 able-bodied workers. Can they not handle 2,500 hectares of arable sovkhos land and 1,200 head of cattle? If they undertook this work in a harmonious manner, they could make a plaything of the sovkhos!

But such a harmonious and business-like mood is lacking. Approximately 400 individuals are working at the sovkhos while the remaining ones tend their private gardens in behalf of market earnings. Some, for the sake of appearance, serve as firemen, maids or guards and there are even families, albeit young ones, in which nobody performs even a day's work in behalf of public production.

Let us take for example a family having the same surname as myself, the Peregudov's -- Viktor, Vladimir and Vasil'y, or V. Gridnev or Yu. Machkov -- neither these individuals nor their wives are familiar with the roads which lead out onto the sovkhos fields.

There are many such families. Some deal in cucumbers, others in onions and still others in potatoes or seed. It must be confessed that up until now we have

been very good-natured about all this. It would seem that we are too embarrassed to look into somebody else's pocket. But if a fellow is greedy for money, will he not steal from you?

Because of such reasoning, we began to overlook the fact that the collective character of labor -- one of the principal values of our system and the first condition for building communism -- is conscientious labor on the part of all and each individual in behalf of society.

Thus it is only proper for the new draft reading of the CPSU Program to reflect the requirements for campaigning in every possible way against the private ownership psychology, against attempts to utilize socialist property for personal enrichment and against money-grabbing, speculation and self-seeking attitudes. These requirements can perhaps even be strengthened. And the tasks of the legislative and legal protection organs, with regard to protecting society against such phenomena should be emphasized sharply.

The harm which they inflict upon us is not so miserly. Especially from a moral standpoint. My countryman V. Tridnev goes off for a ride in a Volga automobile. He is approximately 30 years of age and already he has acquired a Volga. When excited, he brags among his friends that during a season he earns up to 15,000 rubles for his cucumbers -- just try to earn this figure at a sovkhos! If one argues with him, he will immediately explain that it is wrong for the state to overcharge, to build the BAM /Baykal-Amur Trunkline/ based upon your efforts, to build sputniks or to maintain its vital interests.

Let us assume that he is not propagandizing me. I am aware of this: just as in any other state, the citizens pay for everything that the state builds or maintains. But this is my state and it exists for me and in the final analysis all of these construction projects produce blessings for society as a whole. But if I become rich, I do not enrich society. It is as though I am consuming something that belongs to somebody else.

Yes, a mature individual reasons in this manner. But it makes no sense to confuse young people. Another lad overhears my words and, glancing over at Gridnev, ponders to himself: Peregudov is holding something back. He has worked 40 years at the sovkhos and he has worked well. He was awarded certificates and decorations and selected to serve on the party committee, but he was not able to save money for a Volga automobile.

It is easy to understand how an immature mind entertains such thoughts. We have in our village 12 such young men who, upon leaving the army, simply remained idle for a year or more. They spent most of their time fiddling with machines. An easily made market ruble, similar to rust, corrodes one's soul. And one falls to thinking: how can cucumbers result in the procurement of a refrigerator, for which there is such a demand in all areas. Where does one obtain the water pipelines, pumps and other deficit materials?

From time to time the sovkhos and the village soviet attempt to take in hand these presumptuous gardeners. They seize the illegally operated tracts and appropriate the surpluses. But just as soon as the committee passes through the gates, all of the materials seized are returned. If the sovkhos succeeded

in carrying out sowing work on this land, it is replowed and cucumbers planted. There is direct evidence of intentional spoilage of crops -- a document must be drawn up and the matter taken to court. And a judgment is handed down to no purpose. A fine of 50 rubles is levied -- for the guilty party, this is not money but merely a joke.

Nothing further is done by the legal protection organs. They maintain that no other action is suitable in light of the well known decisions concerning the development of private plots. It is truly a misunderstanding. Moreover, is this not a subsidiary farm? All of us workers at the sovkhos have gardens and farm animals, but this represents assistance and a source for products required to satisfy personal needs. But when an individual exists only on the basis of a garden, then this is no longer a private plot but rather a private farm. This is tantamount to the use of social property -- land -- for personal gain. Indeed, if not one of seven individuals works at the sovkhos or works anywhere else generally, then there can be no thought of entitlement to a private plot! Nor do we need to stand on ceremony here. It is simply a case of enforcing the law that has been established.

We ponder a particular absurdity: a worker who devotes all of his efforts to public production must pay income tax on each honestly earned ruble. Yet the income of a private tradesman is not taxed. Not to mention the land tax -- 80 kopecks per one hundredth -- this is simply petty change. It turns out that the state, while receiving nothing from such cucumber dealers, nevertheless teaches their children and provides them with medical care and other social blessings. Such treatment is not proper for our society.

In short, it is time for us to decide who can become rich and from what and who should work and for what. There is a great need for resolving this question. It is by no means an accident that the new draft reading for the CPSU Program contains the following words in bold type: "The party attaches special importance to strengthening the creative essence and collective character of labor in behalf of our society." The key words were "special importance." Let us proceed in full agreement with these words!

AGRO-ECONOMICS AND ORGANIZATION

UKRAINIAN ECONOMISTS ON MORE EFFECTIVE PRIVATE PLOT ROLE

Recommendations Offered

Moscow ZAKUPKI SELSKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 1, Jan 86 pp 50-51

[Article by V. Golovko, docent at Kiev Trade and Economic Institute, candidate of economic sciences: "Subsidiary, But Not Secondary"]

[Text] With the decisive role of the public sector in agricultural production the population's private subsidiary plots play an important economic role at the present stage of realization of the USSR Food Program.

A total of 9 million families (including 7 million in rural areas), in whose use there are 2.5 million hectares, or 6 percent of all the agricultural areas in the republic, are engaged in private subsidiary farming in the Ukraine at present. From their private subsidiary plots kolkhoz members meet 95 percent of their needs for potatoes, almost 80 percent of their needs for meat and milk and 100 percent of their needs for vegetables.

Practice shows that the development of these plots largely depends on how efficiently Soviet and economic bodies solve problems of allocation of land for collective gardens and orchards and provide assistance in the purchase of greenhouses, building materials, implements and polyethylene film and in the sale of the grown harvest.

The experience of the Malobelozerskiy Rural Soviet of Vasilyevskiy Rayon in Zaporozhye Oblast, where all unutilized land areas, including on private plots, have been registered, can serve as a positive example. As a result, an additional 900 hectares of land have been handed over to the population.

An efficient organization of the sale of surplus products is no less important in collective horticulture and gardening. Difficulties in marketing lead to their inefficient utilization, material expenditures on sales and often direct losses. As the questioning of 5,000 members of orchard and garden associations conducted by the All-Union Scientific Research Institute of Economics of Cooperative Trade of the Central Union of Consumer Cooperatives has shown, difficulties in the sale of the grown harvest are the basic reasons hampering the growth of the production of fruits, berries and vegetables.

Consumer cooperatives and, in part, food industry and public dining enterprises now purchase surplus fresh vegetables, fruits and berries at agreed prices everywhere. However, the volume of such purchases is small: It comprises less than one-third of the products sold by the population.

The purchase of fruits and vegetables on a contractual basis could become one of the directions in the development of private subsidiary plots and increase in commodity output. However, this form has not yet become widespread, although in a number of the republic's rayons and oblasts there is such experience. This work has been skillfully organized, for example, in Kamensko-Dneprovskiy Rayon in Zaporozhye Oblast. On the average, in one season the local rayon union of consumer cooperatives purchases about 600 tons of fresh cucumbers and tomatoes, as well as many other fruit and vegetables products, from the population. Talks among the population about the advantage in selling early cucumbers, tomatoes, fruits and berries to organizations of consumer cooperatives are held in the rayon. Newspapers, leaflets, posters, booklets and prospectuses inform the population of the demand for fruit and vegetable products, methods of planting, harvesting, packaging and transportation, the purchase price and conditions of acceptance of fruits and vegetables.

Cooperative workers in Khustskiy, Rakhovskiy and Mukachevskiy rayons in Transcarpathian Oblast actively organize fruit purchases from the population. Such practice deserves support and attention.

Along with consumer cooperatives wholesale-retail fruit and vegetable combines and sovkhoses could make purchases. Early potatoes, cucumbers, tomatoes, radishes, green crops, stone fruits and berries and table grape varieties should be represented more widely in city stores.

Such a formulation of the problem will contribute to the transition from the self-provision of individual population groups and settlements to a broader provision of individual oblasts and the republic as a whole with agricultural products. This fully agrees with the decree of the CPSU Central Committee "On Measures To Overcome Drunkenness and Alcoholism," which points to the significant increase in procurements on kolkhozes and sovkhoses and among the population of surplus fruits, grapes and berries for the purpose of expanding trade in nonalcoholic beverages, juice, kvas, jams and so forth.

In order to interest the population in an increase in the production of some agricultural crops, primarily green vegetables, in our opinion, it is advisable to solve the problem of granting it the right to a preferential purchase of goods in big demand, as is practised in the system of consumer cooperatives during the delivery of medicinal grass and seeds.

Statements on the establishment of an efficient organizational structure of garden-orchard associations in the republic seem substantiated. The unification of owners of garden-orchard plots and other citizens engaged in agricultural production into a union of associations could contribute to the coordination of their activity and improvement in the sale of surplus products. On the basis of contractual relations with appropriate procurement

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organizations elected boards of republic, oblast and rayon unions of associations and their low-level links (collective gardening associations) could purposefully affect the assortment of products grown on private subsidiary plots, help in the sale of the harvest and undertake functions connected with providing union members with seeds, fertilizers and building and packaging materials. We ought to give thought to the placement of acceptance centers, to bring them as close as possible to places of production and to coordinate the schedules of beltline motor vehicle traffic routes.

Furthermore, it is advisable, in our opinion, to establish in big cities garden construction organizations operating on the basis of cost accounting, which would accept orders from garden-orchard associations for the manufacture of greenhouses, construction of hothouses, enclosures and storage facilities and performance of sanitary engineering and utility line operations.

The problem of marketing nonstandard products, 30 percent of which are often accumulated, is also of great importance. Processing enterprises, which through purchases of nonstandard fruits at low prices could greatly increase the output of juices, jams and other necessary products, should play a decisive role in this.

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Contract System

Moscow ZAKUPKI SEL'SKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 1, Jan 86 pp 51-52

[Article by O. Vovchak, economist, Lvov Trade and Economic Institute: "Contract, Not Formality"]

[Text] The population's private subsidiary plots play an important role in the realization of the Food Program. Therefore, in Lvov Oblast much attention is paid to the development of this category of farms. The problem of the rural population's self-provision with food products acquires ever greater significance every year. Private subsidiary plots in Lvov Oblast contribute to the solution of this problem. In 1984 rural residents with private plots met 82 percent of their needs for meat and meat products, 98 percent of their needs for eggs, 99 percent of their needs for potatoes, 66 percent of their needs for vegetables and 93 percent of their needs for fruits and berries.

Nevertheless, the oblast's population sells the bulk of commodity products through state purchases, whose volumes increase every year. In 1984 state resources received 16,600 tons of meat (in live weight) from private subsidiary plots, which was 67.6 percent more than in 1981. In 1984 state purchases of milk from the population totaled 101,300 tons (including milk on the basis of contracts of kolkhozes and sovkhoses with the population), which exceeded the 1981 level by 71.4 percent. Furthermore, in 1984 private subsidiary plots sold a substantial quantity of potatoes, vegetables, fruits and berries to the state.

During the first half-year of 1985 owners of private subsidiary plots sold 8,400 tons of meat (in live weight) and 59,200 tons of milk to the state. Owners of private plots also sell agricultural products to enterprises of consumer cooperatives and to various trade organizations.

The network of specialized commission stores of consumer cooperatives expands every year. At present there are about 60,000 of them in the oblast's cities and settlements. They have a big selection of sausage products, meat and meat products (pork, beef, rabbits and poultry). The sale of surplus agricultural products is profitable both for the rural and urban population. City dwellers have the opportunity to purchase the necessary products at prices 20 to 25 percent lower than on kolkhoz markets.

Rabbit raising is an important support in an increase in meat production on the population's plots. The assistance provided by the Krolikovod Society to the population contributes to this. In the oblast there are now more than 35,000 rabbit breeders, who at the beginning of 1985 kept about 250,000 rabbits, which was much more than at the beginning of 1984.

The conclusion by kolkhozes and sovkhoses of contracts with the population for the raising and purchase of livestock and poultry has a beneficial effect on an increase in the production of meat in the individual sector. In 1984 state resources received more than 2,500 tons of meat on the basis of contracts.

However, the contractual system's possibilities of increasing livestock products are not utilized fully. Contracts are often of a formal nature. Kolkhozes and sovkhoses do not fulfill contractual obligations, especially with respect to the provision of the necessary feed. This leads to the fact that livestock kept on the private plots of citizens still has a tendency toward a reduction. From 1976 through 1984 the stock of cows was reduced by 33,000 head, or by 13.4 percent. The population keeps mainly low-productive livestock--up to 18 percent of the plots do not own productive livestock.

The shortage of feed, especially concentrated feed, leads to the fact that the number of hogs on the population's private plots also decreases. Furthermore, the shortage of feed is compensated by grain products. Such a squandering of grain is inadmissible. The development of hog breeding is also hampered by the fact that kolkhozes and sovkhoses do not yet fully meet the population's needs for hoglings and do not sufficiently organize veterinary services for animals. Thus, on the oblast's private plots there are considerable potentials for the production of livestock products. In order to activate them, local soviets of people's deputies, consumer cooperatives, kolkhozes and sovkhoses should primarily provide owners of private subsidiary plots with feed for animals, modern implements of labor, equipment and young livestock and poultry.

In our opinion, to increase the efficiency of procurement activity, the oblast's cooperative workers must study food resources on the population's plots everywhere for the purpose of uncovering surplus products. Relations between owners of private subsidiary plots and cooperative organizations should be built strictly on a contractual basis.

Contracts should provide for a countersale of the necessary implements, equipment, mixed feed and scarce building materials to the population, supply of packaging materials and transport facilities and establishment of a sliding scale of purchase prices. When there is a shortage of acceptance and procurement centers, it is advisable to purchase surplus products directly on the population's plots, which will make it possible to divert fewer rural residents from work in the public sector and to better utilize labor resources. We must see to it that the concluded contracts are not of a formal nature, but are efficiently fulfilled by both owners of private plots and procurement officials.

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AGRO-ECONOMICS AND ORGANIZATION

OFFICIAL INTERVIEWED ON PRODUCTION COST, PRICING POLICY

Moscow ZAKUPKI SELSKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 1, Jan 86 pp 31-35

[Interview with V. A. Kufakov, chief of the Department of Agriculture of the USSR State Committee on Prices, committee member, by the editorial board of ZAKUPKI SELSKOKHOZYAYSTVENNYKH PRODUKTOV: "Production Cost and Price"; date and place not specified]

[Text] As is well known, prices are some of the main links in the economic mechanism. The equivalence of exchange among various national economic sectors, strengthening of the alliance of the working class and kolkhoz peasantry, a correct combination of the interests of development of industry and agriculture, to a certain extent the balance of all APK sectors, increase in workers' interest in the expansion of public production and rise in the material well-being of the Soviet people depend on the level and improvement of prices.

The editorial board asked V. A. Kufakov, chief of the Department of Agriculture of the USSR State Committee on Prices, committee member, to answer a number of questions.

Question: Vladimir Antonovich, please tell us how current purchase prices make up for the expenditures of kolkhozes and sovkhoses on the production of agricultural products and how they ensure the normal course of expanded reproduction in agriculture and a successful fulfillment of the plans for the sale of products to the state?

Answer: Current purchase prices of agricultural products (with the markups set) with the existing production cost enable kolkhozes and sovkhoses to have cost accounting profitability at the necessary level--22 to 25 percent. This is due to a significant extent to the increase in purchase prices.

The increase in purchase prices was the most substantial on 1 January 1983. The state allocated 16 billion rubles for these purposes. This was approximately as much as during the preceding 17 years taken together. Such an important measure was necessary and gave positive results. It created

conditions for a general introduction of cost accounting in all the links of agricultural production. In 1983-1984, as compared with the first 2 years of the 11th Five-Year Plan, the annual volume of gross agricultural output in the country increased by 11 billion rubles. During that period state purchases of milk increased by 14 percent, of livestock and poultry, by 11 percent and of eggs, by 7 percent.

In 1983 the total amount of profit from the entire economic activity of kolkhozes and sovkhozes of all systems was 23.7 billion rubles and in 1984 it was 20 billion rubles as compared to 1.3 billion rubles in 1982. Just for exceeding the level of procurements of agricultural products attained during the 10th Five-Year Plan kolkhozes and sovkhozes additionally obtained more than 6 billion rubles in 1984.

New purchase prices and their markups ensure the possibility of profitable production of agricultural products in all the country's republics and zones. On sovkhozes in the USSR Ministry of Agriculture profitability rose from 1.6 percent in 1982 to 20.1 percent in 1983 and to 12.8 percent in 1984 and on kolkhozes, from 2.3 to 25.3 and 21.7 percent respectively. The number of profitable farms increased by 70 percent and that of unprofitable farms decreased to almost one-fourth. Furthermore, the efficiency of utilization of state resources allocated for the development of agriculture rose. Internal sources in the expanded reproduction of kolkhozes and sovkhozes now comprise a bigger part as compared with budget allocations and bank credits. This contributes to the development of the operative independence of collectives and expands their possibilities of promptly and overallly solving many organizational and technological problems.

As a result, despite the rise in the cost of means of production compensated for agriculture by an increase of 5 billion rubles in purchase prices, in 1983 there was a decrease in the production cost of a number of agricultural products on the country's kolkhozes and sovkhozes.

Experience in poultry breeding, in the fattening of hogs and cattle on an industrial basis and in vegetable growing under greenhouse conditions shows convincingly that automation and a high level of mechanization, that is, saturation with industrial means of production and its efficient organization, are not cost raising factors, but the basis for a reduction in production cost and high profitability.

The improvement in the economic mechanism made in our country requires intensified attention to one of its major elements--production cost, analysis of the causes of its growth and determination of ways of reducing it.

The utilization of advanced methods of organization of agricultural production and a systematic introduction of intensive technologies are the most important directions in a reduction in production cost. In 1985 grain crops were grown on 17 million hectares and over a long-term period their area will increase significantly. As a result, the country will additionally obtain millions of tons of high-quality grain, mainly strong and valuable wheat, which will increase the stability of grain farming. Additional expenditures will be more than recovered through an increase in output.

The April (1985) Plenum of the CPSU Central Committee noted the following: "Widely utilizing the achievements of the scientific and technical revolution and bringing the forms of socialist management into line with present conditions and needs, we must attain a significant acceleration of social and economic progress. There simply is no other way."

The party considers the acceleration of scientific and technical progress the main lever in the intensification of the national economy. Kolkhozes and sovkhozes now have significant potentials for reducing production cost through an efficient utilization of material resources. For example, let us take the utilization of grain fodder. As is well known, fundamental importance is attached to this matter.

It should be noted that the structure of grain production still remains inefficient. For example, in 1981-1983 food grain accounted for 56.2 percent and fodder grain, for 43.8 percent. As a result of the shortage of fodder grain, a deficiency of feed protein partially covered by mixed feed made of wheat is observed in animal husbandry. Owing to the imbalance of fodder in protein and lysine, a big overexpenditure of grain, which can be used for food purposes, is observed.

Owing to the improvement in the structure of the grain allocated for fodder, as well as to the expansion of areas sown with sunflowers, soybeans and rape, the overexpenditure of fodder grain can be reduced by 21 million tons over a long-term period.

Taking into consideration the shortage of concentrated feed, under present conditions, as a result of a fuller utilization of the capabilities of the pasture period and a better balance of feed in terms of nutritiousness, it would be advisable to lower its proportion in rations. At the same time, the proportion of grain in concentrates should be reduced.

Kolkhozes and sovkhozes still incur big losses of agricultural products and produce low-quality products. Now, when order is actively introduced in all economic matters, V. I. Lenin's words are especially relevant: "Keep an account of money accurately and conscientiously, manage economically, do not loaf, do not steal and observe the strictest discipline in labor" (V. I. Lenin, "Sobr. soch." [Complete Works], Vol 36, p 174).

Question: Please tell us about the policy of purchase prices conducted by the state in recent years.

Answer: The decree of the CPSU Central Committee and the USSR Council of Ministers adopted in 1983 "On Improving Economic Mutual Relations of Agriculture With Other National Economic Sectors" determines that, when establishing the level of purchase prices of agricultural products, it is necessary to proceed from the need to ensure the sectorial standard of combined profitability. According to tentative calculations, in order to ensure production growth on kolkhozes and sovkhozes at rates envisaged by programs for the 12th Five-Year Plan, production profitability on kolkhozes

and sovkhozes should comprise, as a minimum, 35 to 37 percent with due regard for budgetary allocations and bank credits and cost accounting profitability, 22 to 24 percent.

The actually formed level of payments for agricultural products at the present ratio of price, budget and credit sources of financing production development ensures the calculated standard of combined and cost-accounting profitability. Under these conditions, in our opinion, current prices and markups (50 percent for exceeding the attained level of procurements, as well as for low-profitability and unprofitable farms) should be basically retained for the 12th Five-Year Plan without any serious changes. The markups remain in effect for 1986

At the same time, prices of some products will be improved. For example, the purchase price of durum wheat grain has now been increased to 150 rubles per ton. Markups on the purchase price set will also be paid: 100 percent for first-category grain, 70 percent for second-category grain and 20 percent for third-category grain. A 50-percent markup on the purchase price for the sale of durum wheat grain to the state in excess of the average level attained during the preceding five-year plan, regardless of whether this level has been exceeded for grain as a whole, has been set.

Question: What is the essence of the effect of economic incentives in the development of agriculture?

Answer: Intensification of the role of economic incentives and material interest of managers, specialists and workers of kolkhozes and sovkhozes in lowering production cost should become an important direction in the intensification of the fight for lowering production expenditures on kolkhozes and sovkhozes. On most farms the existing system of material incentives for workers, managers and specialists of kolkhozes and sovkhozes, essentially, is not connected with a decrease in expenditures. In our opinion, there is an urgent need to develop a procedure of stimulating farm workers and specialists to lower the production cost of agricultural products.

For example, for the saving of direct expenditures on sovkhozes the bonuses paid comprised only 0.75 percent of the total wage fund and about 9 percent of the sum of paid bonuses; on kolkhozes, 0.3 and 9 percent respectively.

In connection with this we must not fail to say a few words about the experiment in the application of the collective contract with full internal cost accounting and the check form of control of expenditures on the Put k Kommunizmu Kolkhoz and Ob, Verkh-Bekhtemirskiy and Cherginskiy sovkhozes in Altayskiy Kray. Here the wage fund for production subdivisions is established on a standard basis (per unit of gross output). During the year workers receive no more than 65 percent of this fund and specialists, minimal salaries lowered by 10 percent. The remaining part of the fund is paid for the produced products on the basis of annual results. Furthermore, a limit of the expenditure of material resources per unit of gross output is established. For the saving of material resources 50 percent of the saved funds are paid additionally and for an overexpenditure, 50 percent of the overspent sums are withheld from the wage fund. Such a search deserves support.

The experience of industry shows that the restoration of the planning of production cost bolstered by the extensive work of labor collectives played a positive role. As a result, the production cost of industrial products was lowered by 3 billion rubles.

In agriculture the indicator of production cost is not planned. By analogy with other national economic sectors, apparently, it is necessary to examine this with reference to agricultural production and to find the possibility of real control on the part of society over the movement of expenditures in agriculture. Here, in our opinion, scientific and planning institutions should engage in earnest in the development of standard production cost according to types of products and the country's zones. On the basis of standard planned production cost it is possible to create a scientifically substantiated system of purchase prices.

Agricultural economic services, which, owing to their function, are called upon to concentrate the efforts of all specialists and of every collective member on an economical and efficient expenditure of funds and to come out against squandering and losses, should be organizers of the fight for a decrease in production cost.

Insufficient initiative and at times a lack of independence in the adoption of economically substantiated decisions led to an underestimate of the need for a prompt solution of fundamental strategic problems of development of individual farms. This can be exemplified by the insufficiently efficient utilization of fixed productive capital, especially in animal husbandry. The imbalance and disproportions in the structure of fixed and circulating productive capital played a negative role there. It was manifested in the form of an incorrect correlation between the available livestock and poultry and the feed on hand. For a long time our agriculture counted on the growth of the production of livestock products mainly through an increase in the stock of animals, not through a rise in their productivity.

The genetic potential of cows makes it possible to annually obtain 3,500 kg of milk and more from them, but over a period of 25 years the country's kolkhozes and sovkhoses have obtained milk within 1,900 to 2,400 kg from them. This is a real potential for lowering production cost and solving problems concerning the growth of milk production envisaged in the USSR Food Program.

Now it is necessary to break the tendency toward an increase in production cost, to stabilize it and to attain its decline. The movement of purchase prices will also depend on how this will succeed.

The fulfillment of the assignments of the Food Program with respect to production volumes and indicators of efficiency will make it possible to improve present economic indicators of kolkhozes and sovkhoses and to lay the foundation for stable cost accounting conditions in agriculture. This is the path to the next stage in the improvement in purchase prices. As in industry, a systematic decline in the level of purchase prices on the basis of the acceleration of scientific and technical progress, industrialization and intensification of agriculture, increasing rates of labor productivity growth,

rise in the efficiency of utilization of land and water, material and financial resources and reduction of wholesale prices of industry should become the basic direction of the above.

Question: There is an opinion that the low profitability and even unprofitability of individual types of products in a number of farms and regions in the country is due to the low level of purchase prices. To what extent is such a statement substantiated?

Answer: In connection with the transition to the evaluation of the activity of enterprises according to indicators of sold output and profit attention to production cost has been somewhat weakened in all national economic sectors in recent years. Such a situation has led to negative economic consequences.

Throughout the country in recent years the production cost of agricultural products has been increasing constantly. There has been a rise in the production cost of most types of agricultural products (with the exception of eggs and poultry meat on sovkhozes).

The increase in production cost in general terms is due to the fact that the growth of production expenditures outstrips the growth of agricultural products obtained. As a result, profitability dropped and the number of unprofitable farms grew. In 1983, as compared with 1965, all the expenditures on the production of agricultural products on kolkhozes and sovkhozes increased 3.3-fold, whereas gross output rose only 1.5-fold.

As is well known, production cost is the price base. On its basis in the last 20 years prices have been corrected in the direction of approximating their levels to socially necessary labor expenditures. Approximately 32 to 33 billion rubles have been additionally allocated annually for these purposes.

For example, on kolkhozes in 1983, as compared with 1966, the production cost of livestock products increased 3.1-fold and purchase prices rose 3.3-fold. During those years expenditures on the production of plant products doubled and prices increased 1.7-fold. On the whole, on the country's kolkhozes production cost increased 2.8-fold, while prices rose 2.5-fold. Production cost and prices on sovkhozes grew synchronously.

However, even after the increase in purchase prices many unprofitable farms have remained. As a rule, these are kolkhozes and sovkhozes selling secondary products produced on a small scale with high labor expenditures. For example, farms unprofitable in hog breeding sell only 17 percent of the hogs received from state purchases to the state. Sovkhozes unprofitable in potatoes, on the average, sell them per farm 3.5-fold less than profitable sovkhozes and sovkhozes unprofitable in poultry and eggs, almost 60-fold less.

Livestock products are unprofitable in the Uzbek SSR and on most farms in the Georgian SSR, the Tajik SSR, the Turkmen SSR and the Moldavian SSR, while plant products (cotton, tea leaves, grapes and others) are highly profitable in these republics. Here animal husbandry gives a relatively small part of the proceeds.

In the republic, where milk and livestock have remained unprofitable, as a rule, the productivity of animal husbandry is low and expenditures of labor and feed are high. For example, in the Georgian SSR and the Turkmen SSR 45 to 50 percent of all the cows do not give offspring annually, which is reflected in the production cost of milk.

As is obvious, the reasons for the low profitability and even unprofitability of individual types of products in a number of farms and regions in the country lie not in the low level of purchase prices, but in the inefficient organization of production.

Under realistically formed conditions the task is to see to it that the income of kolkhozes and sovkhoses grows not as a result of an increase in purchase prices of agricultural products, but through a reduction in production cost and elimination of mismanagement and all types of losses and damages.

The transfer of agricultural production to primarily intensive factors in economic growth is the most important direction in a decrease in production cost. It requires an ever greater application of industrial means of production. Their share in the production cost of agricultural products grows year after year, now comprising 43 percent of the total expenditures in agricultural production, and wages account for 33 percent and feed, seeds and other expenditures, for the rest.

At the present stage in the development of agriculture the rates of scientific and technical progress in it are determined by the weight and quality of machines, mechanisms, equipment, mixed feed, fertilizers and plant protection agents. Under these conditions the first sphere of the APK should operate so that the value of means of production for agriculture grows more slowly than use value. Basic potentials for lowering the production cost of agricultural products lie in APK sectors supplying means of production and servicing agriculture.

Question: Please mention concrete examples indicating that, as a result of the saving of resources, better labor organization, introduction of advanced technology, intensive factors in economic growth and the entire set of economic measures, farms attain stable economic results, a systematic decrease in production cost and an increase in production profitability.

Answer: Practice shows that, as a rule, on kolkhozes applying internal cost accounting economic indicators grow stably and production cost decreases. For example, a system of settlements of accounts among the farm's subdivisions by internal cost accounting checks has been used on the Progress Kolkhoz in Petropavlovskiy Rayon in Altay Kray during the last 10 years. The economic advisability of this system lies not only in the fact that the limit of funds for wages, fuel, fertilizers, equipment repair and other expenditures is presented to every kolkhoz subdivision for a year with a monthly breakdown, but also in the fact that constant operational control over the expenditure of these funds is ensured.

Here everyone begins to count and save. Managers of brigades and other production subdivisions of the kolkhoz are always able to commensurate

production volumes and expenditures on them with limits, to rectify the situation in time if there is an overexpenditure of the established limits and to strictly evaluate the quality of work. Such a cost accounting system is also important, because it accustoms people to order and economy and forces them to constantly fight for a decrease in expenditures and production cost and makes it possible to attain a significant increase in production efficiency.

The practical experience of the Nazarovskiy Sovkhoz in Krasnoyarsk Kray points to the possibility of reducing production cost. The farm is under harsh Siberian natural-climatic conditions. In 1984 the production cost per quintal of grain was 4.33 rubles there, of potatoes, 3.52 rubles and of milk, 15.27 rubles; per quintal of weight gain in cattle, 69.88 rubles and in hogs, 69.15 rubles. This is much lower than throughout the RSFSR and the country as a whole. In 1984 the sovkhaz obtained 10.6 million rubles of profit with a total profitability of 166 percent and from the sale of products, 189 percent.

Do farms in other zones have lesser possibilities? If the country's kolkhoses and sovkhoses had attained the same production cost, they could have saved a substantial sum--35 billion rubles.

Question: What connection do purchase prices have with other prices and, in particular, with retail prices? How do they affect the level of the latter?

Answer: As is well known, purchase prices have a direct connection with the entire system of prices--retail, wholesale, market and commission prices. The value of agricultural products expressed in purchase prices serves as the basis for wholesale prices of goods made from agricultural raw materials and for retail prices of food products. Their increase has a direct effect on the level of market and commission prices.

The policy of ensuring the stability of state retail prices of basic food and nonfood products is implemented systematically in our country. Prices of bread, potatoes, meat, milk and other daily food products have not changed for many years and even decades. This guarantees a real increase in the population's income under conditions of an increase in wages and in payments from public consumption funds.

As a result of the rise in purchase prices, expenditures on making up for the difference between purchase and retail prices of plant and livestock products purchased from kolkhoses and sovkhoses, as well as on private plots of kolhoz members and workers, increased. According to the data of the USSR Ministry of Finance, in 1984 these subsidies totaled more than 20 billion rubles for meat, 14.1 billion rubles for milk, 3.6 billion rubles for grain and oil seeds, 2.4 billion rubles for potatoes and vegetables and 3.8 billion rubles for other products. Purchase price markups for low-profitability farms totaled 9.8 billion rubles.

In all, state subsidies totaled 54.7 billion rubles.

The compensation for the difference in prices during the purchase of meat and milk accounts for the bulk of expenditures. In 1984 outlays on the

compensation for the difference in prices reached 14 percent of the state budget expenditures.

The subsidy per kg of livestock products purchased by the state from kolkhozes and sovkhoses and on subsidiary plots of kolkhoz members and workers also increased. Payments from the budget per kg of product now total 3.68 rubles for beef, 1.97 rubles for pork, 0.29 rubles for milk and 6.23 rubles for butter.

The big allocations for the compensation for the difference in prices require an intensification of economic work on lowering expenditures on output and reducing losses.

At the present stage of our country's development the subsidy for food products as a means of social regulation is a forced and, for the next few years, necessary measure. As a result of the strengthening of the role of other levers of social regulation and, especially, wages, the need for state subsidy for food products can and should be lowered basically as a result of a decrease in production expenses and in expenditures on the storage and sale of products.

As is well known, in the last few years there has been an increase in the cost of industrial means of production, which has led to a rise in the production cost of agricultural products. At present, after the May (1982) Plenum of the CPSU Central Committee, a reliable barrier has been placed to an unjustified increase in the cost of industrial means of production allocated for agriculture. The decree of the CPSU Central Committee and the USSR Council of Ministers adopted in July 1983 placed the control of the ratio of purchase prices of agricultural products and wholesale prices of industrial products on a state basis. According to an especially developed method, as of 1983 the USSR Central Statistical Administration and the USSR State Committee on Prices calculate the indices of change in purchase and wholesale prices of industrial products sold to agriculture and in prices and rates of services provided for agricultural enterprises and organizations.

The consolidated index of purchase prices (payments) with due regard for their rise and markups and the increase in the amounts of payments of 50-percent markups for exceeding the level of sale to the state during the 10th Five-Year Plan and improving the quality of products in 1983 in relation to 1982 comprised 126 percent, or 21.9 billion rubles. Furthermore, as a result of the increase in volumes of state purchases of agricultural products, payments to farms increased by 5.5 billion rubles.

The consolidated index of wholesale prices of industrial products and rates of services, at which they were sold to agriculture, comprised 107 percent. The total amount of the relative increase in the cost of means of production for agriculture with due regard for a reduction in the cost of mixed feed and new equipment per unit of useful effect reached 2.8 billion rubles. The increase in cost compensated to agriculture with due regard for the growing volumes of deliveries of industrial products totaled 5 billion rubles.

At the same time, in the press and scientific publications the problem of increase in cost is presented without due regard for the last increase in purchase prices and markups and for the decree of the CPSU Central Committee and the USSR Council of Ministers of 1983 on Improving Economic Mutual Relations in the APK. This is incorrect.

I shall cite several examples. In 1975 a 75-hp caterpillar tractor cost 2,519 rubles and in 1983, a total of 3,505 rubles, or 24.3 percent more. At the same time, however, during those years purchase prices of grain crops rose by 28.8 percent, of potatoes, by 69.4 percent and of milk, by 72.8 percent. In 1975 for the purchase of this tractor a farm had to sell 25.4 tons of grain, or 31 tons of potatoes, or 11.7 tons of milk and in 1983, a total of 23.4, 18.9 and 8.4 tons respectively.

In order to buy a ZIL-MMZ-555K dump truck in 1975, a farm had to sell 27 tons of grain, or 35.3 tons of potatoes, or 14.1 tons of milk and in 1983, a total of 21.4, 21.3 and 8.32 tons respectively.

A similar situation in the ratio of wholesale and purchase prices is also observed for other basic means of production.

The program demands of the CPSU on the strategy of economic development in the area of planned price formation signify that under the conditions of the planned increase in the efficiency of public production the stabilization of prices and rates and a reduction in the existing level on the basis of the achievements of scientific and technical progress, labor productivity growth, saving of resources and decrease in production cost should be the main principles of the further improvement in the entire economic system of prices and rates.

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AGRO-ECONOMICS AND ORGANIZATION

ESTONIAN AGROPROM RESTRUCTURING DISCUSSED

Moscow PRAVDA in Russian 3 Jan 86 p 2

[Article by V. Shirokov, Estonian SSR, "Estonia: From the First Step"]

[Text] This small three-story building in Stary [Old] Tallinn is not distinguished in any way except for a new sign at the door: "State Agroindustrial Committee of the Estonian SSR." But if the invisible magnetic fields of public and state interests had manifested themselves, today they would surely be concentrated precisely in this unobtrusive building. The country's Gosagroprom [State Agroindustrial Committee] is taking its first steps. How successful the further path will be depends on the energy, firmness, and resoluteness of these steps.

"How does the restructuring attract the rural workers?" says the chairman of the Estonian Gosagroprom, Kh. Veldi. "The land has only one master. The agro-industrial associations now bear full responsibility for the production and processing of produce and providing the farms and enterprises with resources."

The potential of Gosagroprom which is contained in documents adopted by the party and the government is great. But only people and their initiative, enterprise, desire, and ability to work in the new manner can realize it and fill the new form with full-blooded, living content.

The session of the board at which the first chiefs of the republic agroprom's administrations and departments were approved was concluded literally five minutes before our meeting with Kh. Veldi. The selection of specialists and the formation of the personnel structure had begun.

"The principles for the selection and placement of personnel are as follows: competence, efficiency, and increased self-demandingness," Kh. Veldi continues. "This work is important, difficult, and painstaking and, I would say, requires a jeweller's precision. The evaluation of the specialist-leader's qualities should be comprehensive and weighed."

I become acquainted with the biographies of those "reins of government" who are taken into the republic's Gosagroprom. The veterinary and state veterinary inspection administration is headed by I. Soydro, a knowledgeable, experienced specialist with many years of experience. A. Pyuvi, who became chief of the amelioration department was a worker, completed the agricultural academy in

Tartu, and directed amelioration work in the inter-rayon section of Selkhoztekhnika and then in its republic apparatus. And here P. Maspanov, appointed deputy chief of the administration for processing meat and dairy products, is quite young. But he succeeded in undergoing good tempering. He was cited with the prize of the USSR Council of Ministers for participation in the reconstruction of the Pylvaskiy combine for the production of dried dairy products. He was sent to the lagging Kokhtla-Yarveskiy dairy combine and brought it up among the leaders in two years.

Such a combination of maturity, experience, and youthful energy also formed the basis for the formation of the Gosagroprom apparatus.

"The range of tasks for the new control organ is broad," says the chief of the department of agriculture and food industry of the Estonian Communist Party's Central Committee, I. Kallas. "Its leaders must possess the highest competence, organizational abilities, and a keen sense of what is advanced. Therefore, in considerable measure we are relying on young, talented specialists who have already shown themselves. In worth and experience."

The restructuring is proceeding rapidly, but also without rash haste. I had the occasion to be present at a session of the bureau of the Estonian Communist Party's Central Committee where V. Lind and T. Kvukhknawere confirmed for the posts of first deputy chairmen of Gosagroprom. They were admonished as follows: "Don't hurry to achieve full manning levels at once, it is better that they be understaffed at first than suffer with chance people later...." Common sense, and it was accepted for guidance.

Estonia's Gosagroprom, perhaps, has many advantages. The Agroprom association which was created on the basis of the Ministry of Agriculture, the State Committee for the Supply of Production Equipment for Agriculture of the Belorussian SSR, and the State Committee for Water Management of the Belorussian SSR has been operating here for almost three years. Thus, it is not necessary to start from scratch. Associates from a number of other ministries are now pouring into the apparatus. This is eliminating duplicate elements. But the reduction is far from a painless matter. The fates of almost 260 people are to be decided and new work must be selected for them.

And here is what is noteworthy. There is no nervousness or bustle in the corridors of Gosagroprom or the ministries which have been abolished. No rumors and gossip are circulating. Once again experience makes itself felt--during the organization of the agroindustrial association in the spring of 1983 the departments which were eliminated were reduced by more than 100 people. And no complaints were received from them concerning job placement. Then, just as now, a special commission was created which conducts talks with each one, ascertains desires and intentions, and offers versions of the new work.

The commission members requested data on vacancies in the republic's State Committee for Labor and in rayon agricultural associations [RAPO]. The council chairman of the Kharyuskiy RAPO, K. Payumyagi, related:

"The request which arrived from the republic's Gosagroprom concerning job placement for several specialists from former departments arrived opportunely. On our farms the time has come to replace several supervisors and chief and senior

specialists. I believe that the suburban rayon will come to us willingly. Frankly speaking, we also kept an eye on some of them for the RAPO apparatus. We need people with a broad view of problems and mastering a republic level of management--this will help the quality growth of the RAPO. At the same time, some of our specialists who live in neighboring villages have expressed the desire to return to the farms, a little closer to practical work."

Such an approach is providing good results.

In turn, the council chairman of the Pyarnu RAPO, A. Soasepp, was promoted to the central apparatus of Agroprom. He brought with him fresh thinking and a profound knowledge of the lower elements of the APK [agricultural-industrial complex] and their problems. In the new apparatus of Gosagroprom he headed the administration for the production and processing of plant-growing products.

The agriculture of Estonia, just as of the entire country, is experiencing a remarkable time. But also one which is extremely strained: restructuring is under way.

"From now on there is one master in the village--RAPO, but you see, there is also only one responsible," the same K. Payumyagi muses. "This means that there is no reason to wait for instructions from above. We must act ourselves. Let us say, we organized interfarm columns to carry fertilizer to the fields. We allocated 10 K-150 tractors and other machines from the rayon resources. It is of great assistance for the poor farms. We are building a shop to process rape seed in the farm imeni Lauristin. There will be both magnificent oil and oil cakes for the animals."

...I wanted to hear the opinion of the person on whose initiative the first agricultural association was created 10 years ago in Vilyandiskiy Rayon of Estonia. Now V. Udam is first secretary of the Pyarnu party raykom.

"The new matter needs new people," he believes. "People with unusual thinking, resolute, who are not afraid to assume the burden of personal responsibility. That is how we proceeded at one time in Vilyandi, summoning under the RAPO banner energetic economists, agronomists, and livestock experts who were not burdened with obsolete notions, and they moved the matter forward. And this is how we proceed today. In Pyarnu RAPO is headed by young specialists. They brought with them new trends and fresh ideas. For example, in accordance with their suggestion the RAPO scientific and technical council was created. It includes institute personnel and skilled workers."

The new matter needs new people. Correctly observed. But, as is known, talented leaders and organizers are not raised in greenhouses. They are brought forth by life and new, important problems facing the national economy. In Estonia's Gosagroprom they are convinced: there are such people and they must be found. It is just that the approach to their selection should be thoughtful and thorough, but also, without excessive sluggishness. Time marches on.

TILLING AND CROPPING TECHNOLOGY

PROBLEMS IN INTENSIVE CROPPING TECHNOLOGY OUTLINED

Moscow SELSKAYA ZHIZN in Russian 24 Jul 85 p 1

[Article by N. Osyhkin and Yu. Semenenko, special correspondents, Krasnodar Kray: "The Field Roads Tell a Tale: The First Experiment in the Introduction of Intensive Technology for Growing Winter Wheat in Krasnodar Kray"]

[Text] The summer harvest was in full swing in the Kuban. The wide panorama of the harvest could be seen right behind the agrochemical center of the Iskra Kolkhoz in Timashevskiy Rayon. A second harvesting-transportation complex was working in the wheat field. The shuttles ran along the "Niva" plowed strip, on which trucks were hauling the precious grain from the combines. The harvested grain poured from the trucks in a golden stream. There were also a unit for technical maintenance, a temporary shop with a welder and a vehicle maintenance point here.

Not far away was a mobile agitation point. At the entrance, a news bulletin board announced that first place in yesterday's competition had been won by the links of combine operators V. Ya. Sukhno, M. A. Nikitenko, N. A. Varava and drivers V. N. Fedorov and S. A. Naumov from the Timashevskiy Motor Vehicle Enterprise. In a shift they harvested and hauled 1,232 quintals of grain to the threshing floor and gathered over 600 quintals of straw.

These are the most progressive crews. Their combines can be recognized by the red flags attached to the cabs. Each unit has two drivers who replace one another. It was therefore not necessary to stop the equipment for a short interview.

Nikolay Varvara noted: "The machinery is operating trouble free, equipment and personal services are well organized and there are no complaints about the organization of labor. Only the weather is letting us down, however, it has become drier. We are hoping to make up 3-4 hours during the night and raise the daily output per unit to 500 quintals.

He is supported by driver Vladimir Fedorov:

"The combines are working nonstop. We are not causing any delays. We are trying to move the grain to the threshing floor more quickly. It is a large responsibility, after all, we are harvesting the crop from fields on which

intensive technology has been used.

This is true. Progressive methods of work and crop production required that all field workers show special skill and ability and not the slightest trace of simplification. With what great diligence field roads made into the kolkhoz wheat fields and without exaggeration, machinery operators called them the roads to a good harvest! These roads are well worn. In the words of S. I. Kolesnikov, the farm's chief agronomist, they were used 4-5 times. Fertilizers, herbicides, and poisonous chemicals were applied at the right time. This was not according to the principle "a little bit more", but in an economical manner, with exact scientific calculation.

Each object in the excellently equipped kolkhoz laboratory has its exact function. There are modern instruments for determining soil moisture content and nutrient balance. R. P. Mishchenko, the head of the laboratory, explains:

"In the course of a year we make two complete analyses of all fields. We also determine the nitrogen and potassium content. Leaf and stubble diagnosis is the basis for giving agroservices recommendations for the time and dosage of fertilizers during vegetative growth. Each of our fields has its agronomic description."

Having an accurate agronomic compass, grain growers at the farm could conduct all operations on the intensively farmed fields without making any errors. They chose the correct times, methods and dosage for fungicides. As a result the leaves were grey-green up until the end of irrigation -- a true sign of wheat's well being. The pya'vitsa [trans. unknown], a very bad enemy of the harvest, was eliminated on time. The edges of fields were tilled, in some cases, continuously. The leaf system punctually "pumped" nutrients to the grain right up until the very end of vegetative growth. Therefore, it is planned to gather up to 40 quintals from each hectare.

The harvest was also full on other farms in the kray, where great attention was paid to the introduction of intensive technology. Together with P. M. Globiy, chairman of the Pobeda Kolkhoz in Korenovskiy Rayon, I walked through the fields of the farm, at which three harvest-transportation complexes were working. All operational-technical links are working in a precise rhythm.

Pavel Mikhailovich, picks up a bunch of grain with tightly packed ears from a windrow.

"Do you feel the weight? The grain is filling out in spite of all adversities."

The Partizanka variety of wheat is good in its own right. Machinery operators harvest up to 50 quintals and more from every hectare. Now nature has given the farm's grain growers an especially severe test: Are they walking in step with science and progressive experience and are they capable of solidly, yet flexibly following the intensification program? Everything was there and there was dry fall weather. The grain growers were faced with a dilemma: plant the wheat at optimal times, or put it off. Then there were heavy frosts, lack of snow cover, prolonged cold weather, creating good conditions for fungal

diseases; harsh May droughts, interspersed with frequent rains. All this caused outbreaks of predators and diseases

Such situations occur everywhere in the Kuban. It is difficult to say what turned this around in past years. Now the harvest losses from extreme conditions are not so significant. In the majority of cases they simply did not perform all the recommended agronomic measures, but made appropriate corrections in the situation as it progressed.

Farmers did not simply follow past patterns in determining the planting times. A new, very promising variety, the Obriy, which came to the Kuban from the Ukraine, was planted 3-5 days earlier than the time recommended for the kray's central zone. On the other hand, they waited with Partizanka, and planted it at the end of the optimal time. Scientists and practical workers had many discussions about seed placement depth. Some tried to make the 1-2 centimeter deep furrows, but the traditional depth, 6-8 centimeters, was used. This is how they planted in Timashevskiy Rayon, where intensive technology has been introduced on almost all land and the greatest effect is now being obtained in grain production.

Intensive methods were used on hundreds of thousands of hectares in the kray for the first time. The magnitudes are large, but how did the results turn out? Unfortunately, the answer to this question is not comforting. Yields of wheat -- the main grain crop -- declined somewhat compared to last year. Understandably, technology itself is not to blame for this. There is no doubt about that. Why were the yields lower than expected?

Some are inclined to attribute the causes to unfavorable weather conditions. As is said, they were not included in the calculations. However, can only objective factors be blamed? By no means! We visited many farms in various zones in the kray and met with scientists, specialist and experienced grain growers. This was not only during the harvest, which revealed many problems of an organizational, agronomic and technical character. These shortcomings were also seen during other periods. The weather only made things more difficult.

When driving along fields of some farms in Novopokrovskiy, Vyselkovskiy, Korenovskiy, Krasnogvardeyskiy, Dinskiy and other rayons, one saw large numbers of weeds everywhere, including on "intensive" massive fields. These included ragweed, sowthistle, orache [or goosefoot "lebeda"] and other harmful vegetation, even near field roads, where logically they should not have been. Is this paradoxical. We went to other, different fields, for example, at the Rossiya Kolkhoz in Giaginskiy Rayon, and easily understood the difficulty. There, since spring, they had repeatedly used tractor drawn sprayers to kill weeds along the field roads.

The situation is similar on several dozen farms in the Kuban. The winter and spring explanations of agronomists hardly satisfied RAPO managers. They said that it is, in every way, handier to use airplanes to top dress and treat crops. The pace is faster, the materials are distributed more evenly and it can be done when it isn't possible to go out on the fields. True, aviation should not be rejected, especially where there are hard surfaced airfields. Why, however, not run ground based equipment along the field roads? After all,

this is a more effective measure. No convincing answers to this question was heard in rayons or at the kray center. Nine hundred units for spraying along field roads were made ready on time, but most of them did not go into operation. As a result, various types of rusts, fusarial wilts, septoria, root rot and weeds did great damage to the crops. Only during half of the ripening phase did the foliar spraying equipment work on many wheat fields in Novopokrovskiy, Krasnogvardeyskiy and Krylovskiy rayons. As a result, yields here are only 25-30 quintals per hectare. Plant diseases have done their dark deeds.

We have now come to a major factor guaranteeing success in any new undertaking. This is psychological restructuring. Sad as it may seem, many workers, even at the kray level, have not gone through this. As a result, in a number of places intensive technology is viewed simply as a mechanical sum of quintals and kilograms of fertilizers, herbicides and pesticides, and not as a qualitatively new level of operations on the land, a monolithic fusion of science and progressive experience.

There have been manifestations of the old idea that one can have a good harvest by correctly performing individual, basic agronomic measures. As a result, the entire technological chain is broken. Worse yet, increased applications of fertilizers even lead to somewhat of a reduction in wheat's resistance to diseases and serve to lure pests. The new technology has cast light upon all the faults of the wheat fields and has shown that it requires the highest standards.

Kuban farmers are doing massive harvest work. Grain and pulse crops have been harvested from more than half the area. Thousands of combines are working on the fields of wheat raised by intensive technology. By no means at all farms have the yields been as high as expected or the progressive methods proven their effectiveness. The grain is moving. More than 1 million tons have arrived at elevators. Next year the new technology will be used on another 1.3 million hectares. It is now important to draw the correct conclusions from this season's lessons in order to successfully plant winter wheat and to lay a reliable foundation for the harvest in the first year of the 12th Five-Year Plan.

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TILLING AND CROPPING TECHNOLOGY

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INTENSIFIED WINTER WHEAT TECHNOLOGY USED IN KRASNODAR KRAY

Moscow SELSKOYE KHOZYAYSTVO ROSSII in Russian No 4, Apr 85 pp 34-36

[Article by G. Romanenko, deputy director of the Scientific Research Institute of Agriculture imeni P. P. Lukyanenko, and A. Naydenov, head of the farming division: "In Order To Obtain a Guaranteed Harvest"]

[Text] The scientific research and practice of farms convince us that the introduction of individual, even though very effective, elements of technology of cultivation of agricultural crops, as a rule, does not give positive results. These elements make it possible to increase gross output and to obtain maximally possible harvests only if taken jointly.

Overall industrial technologies for the production of winter wheat grain have been developed and are widely introduced in Krasnodar Kray. During 4 years of the 11th Five-Year Plan farmers have been able to obtain a high harvest per hectare largely owing to these technologies. The proportion of strong and valuable grain in the total volume of wheat procurement annually comprises 56 to 68 percent.

The intensive technology of winter wheat cultivation has been undergoing a production check on experimental production and base farms of the Krasnodar Scientific Research Institute of Agriculture imeni P. P. Lukyanenko since 1981. The technology envisages the utilization of high-yielding, intensive-type, new varieties resistant to lodging; full provision of plants with balanced doses of nutrient elements with due regard for their content in soil; split, according to the data of soil and plant diagnosis, application of optimal doses of nitrogen fertilizers during the vegetative period; application of growth regulators and an integrated plant protection system. The use of ground equipment on a permanent track is one of the fundamental distinctions of intensive technology. It envisages obtaining guaranteed harvests of 60 to 80 quintals of high-quality grain per hectare (depending on the predecessor and the kray's zone).

A production check of the new technology was carried out on the experimental production farm imeni M. I. Kalinin in Pavlovskiy Rayon in 1982. Winter wheat of the Krasnodarskaya 57 variety was sown after a predecessor (peas). Two

variants were studied: one with a permanent track and another, the improved technology applied on the farm. The experiments were set up on an area of 94 hectares. The date and doses of application of mineral fertilizers, herbicides and fungicides were determined by technological charts in terms of 60 quintals of grain per hectare. In fall and winter ground equipment was used basically and in spring, in connection with the large amount of precipitation during the tillering and shooting phase, aviation replaced it partially. The yield in control was 54.5 quintals per hectare and, when the technological track was abandoned, 2 quintals less. A refinement of seeding rates has shown that with a high standard of farming and a good provision of plants with elements of mineral nutrition the yield with a seeding of 3 and 5 million germinated seeds per hectare is essentially the same.

In 1983 the scientific production experiment connected with the mastering of the intensive technology of winter wheat cultivation was conducted on six farms in the kray's northern and central zones--basic zones of commodity grain production. Experiments were set up on common, low-humus, deep typical and leached very deep chernozem. The average annual amount of precipitation on these farms is 520 to 600 mm. In addition to this, the northern zone is subject to a severe wind erosion.

Methods of cultivation usual for the zone were applied as control on one-half or part of the experimental field. Experiments were set up under complex weather conditions. In fall there was no precipitation and it was hot for a long time. The arable soil layer was extremely dry, the conditions for seed germination deteriorated and the appearance of shoots was delayed. The rain that fell in November and the warm weather in December and January improved the growth and development of wheat. By the second 10-day period in January all its sowings carried out according to intensive technology were in the tillering phase. However, at the end of January the soil temperature at the depth of occurrence of the tillering node was lowered to -8 degrees and the conditions for the wintering of plants became very unfavorable. Furthermore, the intensification of the velocity of the eastern wind up to 16 or 20 meters per second produced a rapid drying of the upper soil layer--dust storms began. Therefore, the sowings of winter wheat cultivated after a semifallow predecessor suffered greatly in northern and south-eastern regions, especially where the technological track was located along prevailing eastern winds.

Despite the extremely difficult conditions, the careful observance of the cultivation technology and the high quality of field work made it possible to obtain an average of 54.3 quintals of grain per hectare on an area of 642 hectares and 61.5 to 66.6, on individual fields. A high harvest was obtained on all farms and after all predecessors. The increase in the harvest of winter wheat grain cultivated according to intensive technology, as compared with the ordinary technology used on farms, ranged from 1.8 to 19.5 quintals per hectare (table).

As a result of what were the increases in the harvest obtained?

For every zone scientists recommended highly productive and better regionalized semidwarf varieties resistant to lodging. Winter hardy krasnodarskaya 57 and olimpiya varieties were sown in the kray's northern

zone, for example, on the Experimental Production Farm imeni M. I. Kalinin. Their harvest exceeds the harvest of bezostaya 1 by 5 to 7 quintals. In the conducted experiment krasnodarskaya 57 produced 62.2 quintals, which is 11.2 quintals higher than with the ordinary technology. Such a significant increase is largely due to the high effectiveness of the bayleton preparation, which prevented to a significant extent powdery mildew, septoria spot and other diseases of wheat. The most productive olimpiya variety, one of the latest to be regionalized in the kray, is resistant to diseases and does not require the application of fungicides.

Table

Farms	Variety	Technology	
		intensive yield, quintals per hectare	ordinary
Experimental Production Farm imeni Kalinin in Pavlovskiy Rayon	krasnodarskaya-57	62.2	51.0
Kuban Sovkhoz in Gulkevichskiy Rayon	estafeta	57.0	48.0
Kuban Kolkhoz in Ust-Labinskiy Rayon	partizanka	59.8	48.9
Pamyat Lenina Kolkhoz in Timashevskiy Rayon	bezostaya I	42.4	40.7
	partizanka	44.3	42.6
	krinitsa	39.6	36.8
Kolkhoz imeni M. Gorkiy in Tbilisskiy Rayon	partizanka	66.6	47.0
Kolkhoz imeni 22 Partsyezda in Shovgenovskiy Rayon	krasnodarskaya 57	47.3	42.6

The growing of new varieties on rich soil made it possible to refine their reaction to the increase in the dose of mineral fertilizers. The krasnodarskaya 57 strong wheat variety positively reacted to the increase in doses of nitrogen fertilizers. Grain contained 30.5 to 32.6 percent of gluten. The biological properties of olimpiya did not make it possible to accumulate more than 25.4 percent of gluten, that is, valuable wheat was obtained.

In the kray's southern regions, when intensive technology was studied, the regionalized partizanka variety and the promising semidwarf variety--estafeta--formed the highest harvests. All varieties responded well to the treatment with bayleton and to the increase in the dose of mineral fertilizers. The highest grain quality meeting the requirements of strong wheats was obtained from fields occupied by bezostaya 1 and partizanka. Estafeta, although it increased the content of gluten by 2.3 percent, met the requirements of valuable wheats.

Winter wheat requires quite a definite amount of nutrient elements. Therefore, an agrochemical and phytosanitary soil inspection was carried out on all fields allocated for its cultivation according to intensive technology.

The content of mobile phosphorus and exchange potassium was determined. Rates of application of mineral fertilizers were established on the basis of inspections and with due regard for the need of plants for nutrient elements for the planned harvest of 60 to 80 quintals. At first the calculation was made according to the removal of nutrients with grain and straw, that is, by the balance method. However, it proved to be insufficiently perfect, because it did not take soil properties into consideration. As a result, on some fields doses of mineral fertilizers were overstated. Subsequently, calculations were performed with due regard for the specific soil conditions of every farm.

Phosphorus and potassium fertilizers were applied for basic cultivation. However, in connection with the fact that the experiment was set up in September, when plowing had already been carried out, their deficient amount with due regard for the need of plants for the planned harvest was applied for presowing cultivation. Furthermore, on all fields, simultaneously with sowing, 20 kg of phosphorus were applied to rows. The total dose of phosphorus on the Experimental Model Farm imeni M. I. Kalinin was 100 kg of the active substance per hectare on one field and 280 kg on another and of potassium, 40 to 100 kg. A total of 80 to 216 kg of phosphorus and 165 kg of potassium were applied on the Pamyat Lenina Kolkhoz and 320 and 120 kg respectively, on the Kolkhoz imeni M. Gorkiy.

As is well known, the yield of winter wheat is largely determined by nitrogen nutrition. Our institute's investigations and the data of the kray's agrochemical service show that the maximum effectiveness from nitrogen fertilizers can be obtained when soil properties, existing weather conditions and the actual growth and development of the plant itself are taken into consideration. It has been established that at the beginning of development wheat is satisfied with moderate nutrition. However, during the tillering, shooting and heading period, that is, at the time of formation of productive organs, it requires intensified nutrition. Therefore, additional nitrogen doses were also given at that time.

The rate of nitrogen application in fall was established according to the results of soil diagnosis (the content of mineral nitrogen in the arable soil horizon was determined). If the content of nitrogen available to plants was less than 80 kg per hectare, 40 kg of the active substance per hectare were applied in the kray's northern zone and 60 kg, in the central zone.

Farms also approached the topdressing of crops in a differentiated manner. If in the 40-cm soil layer there was less than 30 mg of nitrogen available to plants per kg of soil, 40 to 45 kg of the active substance of this element was given.

On the Experimental Production Farm imeni M. I. Kalinin in 1984 the 40-cm soil layer contained 50 to 80 mg of nitrogen per kg. Therefore, topdressing was not needed. In 10 days the content of nitrates did not change significantly. After 2 or 3 months their amount was lowered to 22 or 27 mg. Topdressing was needed and a hectare received 45 kg of the active substance.

Late topdressing with nitrogen fertilizers plays a decisive part in the

production of strong wheat grain. For each specific field the dose was determined by the method of leaf diagnosis. On all farms during the blooming-milky ripeness period crops were topdressed with urea. On the Kuban Sovkhoz and the Kuban Kolkhoz this work was done twice. From 30 to 110 kg of nitrogen per hectare were applied. Such a differentiated approach made it possible to most efficiently utilize mineral fertilizers and to obtain high-quality grain.

The high doses of nitrogen fertilizers applied to winter wheat cultivated according to intensive technology generate a need for the application of retardants against lodging. During wet years it is recommended that crop treatment be carried out twice: During the phase of the end of tillering and the beginning of shooting and once more during the phase of two or three internodes. Last year, despite the high doses of nitrogen fertilizers, one treatment with the TUR [chlorocholine chloride] preparation at a dose of 4 kg per hectare during the phase of the end of tillering and the beginning of shooting was carried out everywhere. TUR application was combined with the treatment of crops with toxic chemicals and herbicides. Crop lodging was prevented fully.

An efficient and strict system for the protection of plants against pests, diseases and weeds is the most important element of the intensive technology of winter wheat cultivation. Only first-category seeds treated before sowing with the TMTD preparation in a mixture with fundazol at a rate of preparation consumption of 2 and 1.5 kg per ton of seeds were sown on all farms. Their actual seeding rate was 4.5 to 5 million germinated seeds per hectare. Recommendations concerning the dates of sowing and the depth of seed placement were maintained.

On farms an integrated system of protective measures was developed and the need for pesticides, herbicides and special equipment was calculated for every field. In chemical treatments an important place was assigned to highly effective, new preparations--bayleton, valaton, bazudin, dialen and lontrel. Farm specialists were convinced in practice that, where protective operations were carried out according to plans outlined in advance, the appearance of pests and diseases was observed constantly and preventive treatments were applied, losses of the grown harvest were reduced to a minimum.

The fourth brigade of the Kuban Kolkhoz in Ust-Labinskiy Rayon can serve as an example of a competent application of protective measures with the intensive technology of wheat cultivation. In the spring of 1984, owing to abundant rains, crops were threatened by various types of rust (80.9 mm of precipitation fell in April). However, during the appearance of the first signs of this disease crops were treated twice with bayleton at a dose of 0.6 kg per hectare (10 and 27 April). This made it possible to lower the incidence of brown rust and powdery mildew among plants and to preserve green leaves for a longer period. The phase of waxy ripeness on winter wheat crops arrived 5 to 10 days later than on control plots.

The experience in the introduction of intensive technology has shown that a high final result is inconceivable without strict technological discipline and without the performance of all operations on schedule and in a high quality manner. An important role is assigned here to technical facilities operating

on a permanent technological track.

With the existing set of tractors and agricultural machines a track 1,800 mm wide with two strips, each measuring 450 mm, and with a distance of 10.8 meters between tracks is advisable. At the same time, machines should be the following: DT-75M or T-74 tractors ganged up with three SZ-3.6 or SZP-3.6 seeders on the basis of the hitching of SP-11 or SP-16. Domestic spreaders of mineral fertilizers and sprayers available on farms correspond to the width of cut. The OPSh-15 track, which measures 1,350 mm, can be expanded to 1.8 meters on any farm.

With the intensive technology of winter wheat cultivation the consumption of mineral fertilizers increases. Expensive insecticides and fungicides are used and other agents are consumed. However, all this is recovered by the obtained additional harvest. For example, on the Kolkhoz imeni M. Gorkiy labor and capital expenditures on the production of 1 quintal of grain according to the new technology totaled 1.67 rubles, whereas with ordinary technology, 2.38.

For the 1985 harvest winter wheat cultivated according to intensive technology was sown on an area of 480,000 hectares in our kray. Despite the unfavorable weather conditions of the fall and winter period the state of crops is basically good. There is confidence that every hectare will additionally give 10 to 15 quintals of excellent grain.

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TILLING AND CROPPING TECHNOLOGY

USE OF INTENSIVE WHEAT GROWING TECHNOLOGY IN KUBAN URGED

Moscow PRAVDA in Russian 27 Jul 85 p 2

[Article by K. Aksenov, PRAVDA correspondent, Krasnodar Kray: "Kuban Wheat"]

[Excerpt] Enterprises of the Ministry of the Automotive Industry manufactured 12 carts of an original design. Machine builders brought them to the kolkhoz, assembled them and organized their servicing. This cannot be said about the collectives of the Ministry of Tractor and Agricultural Machine Building. Kolkhoz members expect machines for harvesting, grinding and loading the grain mass and powerful stationary electrically driven threshers from them. True, they not only expect, but with the help of scientists at the Kuban Agricultural Institute manufacture a mobile unit for threshing grain crops on a base.

Kuban farmers have always considered winter crops the main grain. In the last few years they have been especially disturbed by the fate of wheat. During the current five-year plan the kray annually sold an average of 2.4 million tons of wheat to the state. This was seemingly a great deal. However, the plan remained unfulfilled. Moreover, grain deliveries, as compared with the 10th Five-Year Plan, were even reduced. Whereas farmers in Gulkevichskiy, Kavkazskiy, Ust-Labinskiy and a number of other rayons exceeded the assignment considerably, in Novopokrovskiy and Kushchevskiy rayons they coped only with one-half of it. Yet they work under similar conditions.

The marked stagnation in this important matter began to appear not yesterday. In order to overcome it, the overall goal-oriented grain program was developed in the kray several years ago. An increase in the yield and in the gross output of grain was envisaged. Although the harvesting has not yet been completed, it is clear that it has not been possible to attain what has been envisaged.

There are several reasons. However, weak control over the implementation of the grain program is the main one. Advanced technologies and the experience of advanced workers are still applied timidly. The corn field has been placed under the tutelage of cost accounting links and brigades only recently.

There is one task in this program, which should be discussed especially. It is formulated as follows: The growth of gross output and a stable wheat

harvest should be attained "through the development of new varieties capable of not lowering productivity under unfavorable conditions." What turns out in practice?

The Scientific Research Institute of Agriculture imeni P. P. Lukyanenko gave the following report: In 4 years more than 20 new varieties of grain crops have been transferred for testing. It would seem that this is good. However, according to the admission of the scientists themselves, a number of innovations do not withstand the test in practice. It is not accidental that many farms prefer to cultivate "bezostaya-1," although it is inferior to other varieties in its yield. Another reason is a hindrance. Owing to flaws in agricultural technology, other highly productive varieties do not give the full yield.

The fact that during the current five-year plan the production cost of grain on kolkhozes jumped by an average of 22 percent and on sovkhoses, even by one-third evokes concern. Why? The mark of Kuban grain was lowered. For example, in 1978 the kray sold 3.2 million tons of wheat to the state and at that time 93 percent of it was assessed as strong and valuable. Since then many funds have been invested in the sector's development. And the result? In the last 4 years approximately one-third of the grain has arrived at elevators as ordinary grain. Some people attribute the drop to the vicissitudes of the weather. Then how should we explain the fact that in the kray's various zones there are dozens of farms delivering high-quality grain?

As we see, there are many problems in Kuban's grain sector. Basically, the variant of their solution is one--to search for and master the most efficient ways of managing production.

"On some farms," I. Polozkov, first secretary of the kray party committee, says, "wheat cultivated according to intensive technology gives a harvest 1 to 1.5 tons higher than the ordinary harvest. We will now cultivate winter crops by the new method on 1.3 million hectares. We have seriously begun personnel training and the manufacture of a set of deficient machines. The goal is as follows: All workers--from the rayon link to the machine operator--should excellently master the secrets of advanced technology and know its advantages. Without this the necessary yield cannot be obtained."

This is not a simple task. The fate of Kuban wheat, which the country needs so, depends largely on its accomplishment.

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TILLING AND CROPPING TECHNOLOGY

ERRORS IN IMPLEMENTATION OF INTENSIVE TECHNOLOGY DISCUSSED

Moscow PRAVDA in Russian 20 Aug 85 pp 1-2

[Article by M. Odinets, PRAVDA correspondent, the Ukrainian SSR: "Contrasts on the Grain Field"]

[Text] The scale of application of intensive technology on fields in the Ukraine is growing. About 1 and 1/2 million hectares of winter wheat have been cultivated by this advanced method. A skillful utilization of this innovation has helped farmers, for example, on the Kolkhoz imeni Kalinin in Zolotonoshskiy Rayon, Cherkassy Oblast, to raise the yield to 60 quintals of grain and more.

This is the result of an efficient fulfillment of agrotechnical requirements. Gathering the harvest, farmers intend to more fully utilize the advantages of new technology next year. The areas, where it will begin to be used, will expand almost threefold.

It is now very important to learn lessons and to take the errors on the grain field into consideration. In a number of cases they have led to sharp contrasts in the yield.

Grain harvesting has been completed on many kolkhozes and sovkhoses in the republic. On combines returning from fields there are tired machine operators hardened by sun and wind, wearing honorary wreaths of ears. The bad weather greatly hampered harvesting, but the grain yield turned out to be proper in a number of places, especially where intensive technology was applied. For example, on farms in Novoukrainskiy Rayon, Kirovograd Oblast, such tracts of land gave an increase of 10 quintals of grain per hectare. Grain fields in Gorodenkovskiy and Snyatynskiy rayons in Ivano-Frankovsk Oblast were noted for high harvests. On the 40 Let Oktyabrya Kolkhoz in Vasilkovskiy Rayon, Kiev Oblast, each of the 200 hectares of wheat grown according to intensive technology gave 55.6 quintals per hectare. The innovation also made a good showing in a number of rayons in Cherkassy Oblast.

Machine operators and agronomists are satisfied. How can they not be glad? For example, on the Kolkhoz imeni 50-Letiya Oktyabrya and on the Kolkhoz imeni Vatunin in Cherkasskiy Rayon combine operators Andrey Brovko and Ivan Shiyan gathered 52 to 54 quintals of wheat per hectare. The Mayak Kolkhoz gathered a harvest of 53 quintals per hectare. The rayon's "intensive" grain field gave 50 quintals of winter wheat, whereas 43 quintals of grain per hectare were gathered from ordinary tracts of land.

In Cherkasskiy Rayon all agricultural methods, from soil preparation to harvesting, were carefully studied and perfected at seminars. One of them, on the Iskra Kolkhoz, was devoted to the care of crops. The entire cycle of operations was carried out efficiently there. On an area of 3,500 hectares, where wheat was cultivated according to the new method, crops were topdressed repeatedly and treated against pests, diseases and weeds.

"Our average annual production of grain during this five-year plan," N. Chepurnoy, first secretary of the Cherkasskiy Rayon Party Committee, said, "totaled 77,000 tons. We plan to greatly increase its gross output. Intensive technology, which we will apply on 85,000 hectares, will help. We will increase the yield to 55 or 60 quintals. In this case we will additionally obtain output worth 240 to 260 rubles per hectare. Such funds will be sufficient to more than cover all expenditures."

The innovation also takes root confidently in other rayons in Cherkassy Oblast. Winter wheat was cultivated according to intensive technology on more than 100,000 hectares there. On most farms, where agrotechnical requirements were followed precisely, the harvest did not disappoint farmers' hopes. However, there were also kolkhozes and sovkhoses, where intensive technology did not bring the necessary return and did not cover expenditures. Why? In order to understand this, we must look back. In Katerinopolskiy Rayon specialists warily put units into operation on sown areas and were slow in cultivating them. Technological tracks, on which machines were supposed to run, were overgrown with weeds. They "stole" part of the harvest. There was the same attitude toward intensive technology on fields in Kanevskiy, Mankovskiy and Drabovskiy rayons.

Intensive technology became established on almost 100,000 hectares in Kirovograd Oblast. There last fall seeds of highly productive varieties resistant to lodging were sown and the necessary doses of fertilizers were applied. Moreover, good predecessors--fallow and pulse crops--for wheat were allocated. Crops were topdressed and cultivated at the proper time. Now on many farms in Ulyanovskiy, Gayvoronskiy and Novoarkhangel'skiy rayons wheat has repaid labor in full.

However, in this oblast contrasts are also noticeable. In Aleksandriyskiy Rayon the field bears a grudge against many of its managers. How could the Kolkhoz imeni Engels obtain a high harvest if no fertilizers were applied on a plot of 53 hectares? One quintal of mineral fertilizers was applied to rows only during sowing and 1 quintal of ammonium nitrate was sprayed from an airplane in spring. There, as in other farms in the rayon, crops were not treated against pests, diseases and weeds in fall or spring. The tracts abandoned in fall were overgrown with weeds.

Such a disruption is not accidental. Its sources lie not so much in the technical equipment of farms (essentially, it is comparatively the same everywhere), as in the low level of training of specialists and managers. Party committees are largely to blame for this. The same Kolkhoz imeni Engels last year applied only 4.6 tons of organic fertilizers per hectare of "intensive" arable land. It obtained an appropriate harvest, that is, 18.4 quintals of winter wheat per hectare. This occurred on Ukrainian chernozem. However, no one held agronomists and brigade leaders accountable for such miscalculations. The board and the party organization do not satisfactorily see to it that the skills of personnel are improved and control over the way they observe agrotechnology is weak. The Kolkhoz imeni Karl Marx, the Kolkhoz imeni Dimitrov and the Ukraina Kolkhoz work with land poorly. The reasons are still the same.

"Today the specialist should be particularly sensitive to the achievements of scientific and technical progress," A. Tkachenko, Ukrainian SSR minister of agriculture, said. "The role and responsibility of the agronomic service for the harvest and an extensive mastering of intensive technology have increased sharply."

These words are correct. However, both the ministry and its local bodies by no means do everything to increase the skill and maturity of specialists and their personal responsibility for the fate of the entrusted land. Nor do party committees help much in this. However, where this matter is undertaken seriously and thoroughly, results are on hand.

The example of Cherkasskiy Rayon is the best confirmation of this. Intensive technology takes root confidently here, because the rayon party committee has been able to select and train personnel and to direct them toward the solution of the problem set. Today 974 specialists work on the rayon's farms. They know their job and teach machine operators advanced methods. Violations of agrotechnology are encountered here more rarely.

The "intensive field" has shown the ability to work with land in an especially graphic manner. It has become the distinctive mirror of the agronomist, brigade leader and machine operators. Let us take Chigirinskiy Rayon in Cherkassy Oblast. Almost all chief specialists and managers of the middle link have been replaced here during the years of the five-year plan. What is the result of such "shuffling"? The innovation takes root in a much worse manner than among its neighbors and the return per hectare is very modest. Grain harvests on farms in Kamenskiy Rayon, where personnel have been poorly trained for the transition to modern methods of management, have been lowered.

The ear on kolkhozes and sovkhoses in Monastyrishchenskiy Rayon is also lightweight. The Zapovit Lenina Kolkhoz complains about the weather and other reasons in vain. Intensive technology does not justify itself owing to the low level of the agrochemical service and the poor utilization of equipment. Nor can the Kolkhoz imeni Parkhomenko expect success. Local specialists do not even know how many fertilizers they have applied to fields.

The intensification of grain production is a complex task requiring a fundamental improvement in the work of specialists and managers of farms and rayon agroindustrial associations. Without a creative search and an overall utilization of all funds and resources it is difficult to expect the attainment of high results.

In general, the lessons of this harvest campaign make it unequivocally clear that, where the innovation is applied competently and intelligently, it justifies the grain grower's hopes. Taking the experience of advanced workers and their achievements into consideration, the republic's workers plan to expand the "intensive" field next year. The Ukraine's Ministry of Agriculture jointly with scientific institutions takes measures to help practical workers to overcome the errors.

A successful mastering of intensive technologies depends not only on grain growers. Machine builders and chemists are called upon to have their say here. For example, this year farms in Cherkassy Oblast have received 120,000 tons of mineral fertilizers and 200 tons of pesticides less than required. To this day they have not received units for the preparation of herbicide solutions.

Nor does the industry manufacture units for the application of liquid complex fertilizers. The time has come to replace iron tanks and hoses on series sprayers with plastic ones and to improve the quality of manufacture of engines installed on T-150 K tractors. Such miscalculations in no way can be called "particular" and "secondary." After all, the promptness and quality of crop cultivation depend on them. The promptness and quality of operations are the indispensable conditions for a high effectiveness of intensive technologies. As we see, everything is interconnected here.

The republic's farmers have actively embarked on the mastering of this innovation. To help them in this means to increase the yield and gross grain output significantly.

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TILLING AND CROPPING TECHNOLOGY

IMPROVEMENT IN INTENSIVE CROPPING TECHNOLOGY URGED

Moscow ZASCHITA RASTENIY in Russian No 8, Aug 85 pp 8-9

[Article: "According to Intensive Technology"]

[Text] The intensive technology of winter and spring wheat cultivation is becoming ever more widespread in our country. Whereas in 1983 and 1984 it was a question of the experimental application of this technology, now it is utilized on millions of hectares. As the first reports from the unfolding harvest campaign show, "intensive" fields generously repay additional expenditures with a substantial increase in grain harvests.

Success is attained through the selection of highly productive varieties resistant to lodging, placement of crops on the best predecessors, basically on clean fallow, efficient fulfillment of the soil cultivation system recommended for a given zone, split application of fertilizers in strictly measured norms and on the necessary dates and, of course, skillful use of protective measures. Unfortunately, however, it has not been possible to obtain the expected effect from new technology everywhere. As an analysis shows, the reasons for this lie primarily in the inefficient fulfillment of recommended measures, failure to meet the dates of application of pesticides, fertilizers and growth substances and violation of its regulations.

The sowing of winter crops for the 1986 harvest has begun in the country and measures must be taken so that fields established according to intensive technology from the first days may obtain everything that is necessary for plant vegetation and the formation of the programmed harvest.

What should be done? First of all, there must be concern for seeds. They should be large, filled out and with first-category sowing standards. Seed treatment, which ensures crop protection against such dangerous diseases as smut and root rots, is a mandatory method. It is important to promptly organize inspections for the detection of the phytosanitary state of fields, where winter wheat will grow, and the preparation of a certificate for each of them with an indication of predecessors and detected pests, diseases and weeds. The need for material and technical facilities, that is, pesticides, biopreparations, equipment for application and so forth, should be estimated in advance.

Sowing with the laying (where necessary) of a permanent technological tract is a crucial stage. Of course, success will depend on a prompt application of various chemical and biological agents, including the application of pesticides.

The set of protective measures includes the control of mouse-like rodents with an extensive utilization of biological preparations, treatment of crops against snow mold with fundozol (in the zones of disease manifestation), during the phase of full plant tillering spraying with bayleton against all types of rust, which, if necessary, is repeated during later phases of wheat development, and treatment of crops depending on weediness (according to the data of the phytosanitary certificate) with dialen and 2,4-D amine salt with lontrel and against wild oats, with triallate. The dates of pest and disease control are set after the performance of current inspections with due regard for the economic thresholds of harmfulness.

Much attention should be paid to personnel training. Every specialist should know well all the methods of intensive technology, ensure their prompt fulfillment and strictly see to it that equipment and pesticides are utilized efficiently and fertilizers are applied in a balanced manner. It is necessary to increase people's responsibility for the return on invested funds and resources and rise in the production and improvement in the quality of grain. Brigades working by the collective contract method require all-possible support.

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TILLING AND CROPPING TECHNOLOGY

ACCELERATED INTRODUCTION OF INTENSIVE TECHNOLOGY ADVOCATED

Kiev POD ZNAMENEM LENINIZMA in Russian No 17, Sep 85 pp 48-49

[Article by V. Bashtannik, candidate of agricultural sciences: "Policy of Intensification"]

[Excerpts] The need for intensive development also increases in view of the reduction in labor and land resources. Thus, an absolute reduction in the rural population in the country annually comprises more than 0.5 percent. In 1980 there were 0.87 hectares of arable land per USSR resident, whereas in 1958, 1.06 hectares. A reduction in arable land, all things being equal (for example, a stable yield), is capable of leading to a decrease in the volume of production of agricultural products.

Therefore, an accelerated transition to intensive factors is one of the urgent tasks and the main path to an increase in the production of products and to a decrease in expenditures.

As before, the key problem is a steady rise in grain production. The decree of the CPSU Central Committee and of the USSR Council of Ministers "On Measures To Increase the Production of Grain of Winter Crops, Spring Wheat, Corn, Millet and Rice in 1986 Through the Introduction of Intensive Technology of Their Cultivation" published in July of this year envisages ensuring rates of its growth that will fully meet all the country's needs in the next few years.

The yield of grain crops in the republic during the years of Soviet rule has increased 2.8-fold and gross output has almost doubled, although sown areas have been reduced by one-third. Especially significant quantitative and qualitative shifts have occurred during the last three five-year plans. Whereas, on the average, the gross output of grain in the republic totaled 33.4 million tons annually during the 8th Five-Year Plan and 40 million tons during the 9th Five-Year Plan, it amounted to 43.2 million tons during the 10th Five-Year Plan.

However, there are still many unsolved problems. The sector is developing unstably. There is a big diversity in harvests even on neighboring farms. Skill and zonal agrotechnology tested in practice are not competently pitted against weather adversities. Owing to the lack of organization, crop

rotations and new varieties are mastered slowly and the dates of performance of operations are not met.

The retooling of agriculture has opened up prospects for an extensive application of intensive technologies. They are based on new varieties with improved biological and technological qualities, special sowing methods, a prompt and high-quality performance of technological operations and an application of the calculated doses of mineral fertilizers and herbicides.

In the republic intensive technology first underwent a production check in 1979 during the cultivation of corn for grain. The increase in the harvest totaled 10 to 11 quintals of grain per hectare and in Crimean and Kherson oblasts, 22 to 24 quintals. The intensive technology of winter wheat cultivation also proved to be excellent: Farms in Ivano-Frankovsk Oblast additionally gather from 4 to 7.5 quintals of grain per hectare. This year Globinskiy Rayon in Poltava Oblast, on the average, has obtained 23.6 quintals of grain of wheat grown according to ordinary technology per hectare and 38.7 quintals, according to new technology.

More than one-half of the wheat, all grain corn and rice and a significant part of the millet are to be cultivated according to intensive technology in the republic next year. Such technology will be applied extensively during the cultivation of sugar beets, sunflower seeds and vegetable crops, which will make it possible to increase the harvest with a significant decrease in labor expenditures and production costs.

The policy of all-around intensification of agriculture adopted by the party envisages a simultaneous solution of two problems: an all possible increase in soil fertility, a reliable protection of land resources and a careful attitude toward them.

The effect of agricultural implements and energy-saturated and heavy equipment on soil intensifies year after year and more and more fertilizers, toxic chemicals and herbicides are utilized. However, when this is done incorrectly, the physical properties of soil and its water absorption deteriorate, its texture is destroyed and the arable layer is dispersed. The fact that some farms poorly handle the streamlining of the network of intrafarm roads and the consolidation of the construction of villages and livestock farms is also harmful to this matter. Abandoned field camps, old threshing floors and deserted farmsteads are also encountered often. Sizable areas of arable land are occupied by stacks of straw and are vacant near farms.

The decree of the 3d session of the USSR Supreme Soviet of the 11th convocation on the observance of the requirements of legislation on nature protection and an efficient utilization of natural resources is imbued with genuine concern for a successful implementation of the tasks concerning the acceleration of scientific and technical progress set by the party.

So-called "biological farming" opens up great prospects. It is based on mastered and strictly observed crop rotations, an inclusion of leguminous crops and perennial grass in them and an extensive application of organic

fertilizers, as well as of biological plant protection methods. For example, according to the data of the Ukrainian Scientific Research Institute of Farming, as a result of the mastered crop rotation under the conditions of the Ukrainian SSR forest steppe it is possible to obtain a grain harvest of about 34 quintals per hectare without the use of mineral fertilizers and chemicals.

Scientific research has established that, when soil is cultivated in a qualitative manner and a normal density of winter wheat, barley and pea plants in crops is established, there is no need for herbicides. There are many examples of a successful cultivation of row and vegetable crops with the application of a minimal amount of chemicals. Organic fertilizers are the basis for an improvement in the texture of soil and increase in its fertility. No wonder it is said that land "remembers" manure for 3 years.

Preserve and guard land like the apple of your eye--this was V. I. Lenin's bequest to us. Its generosity and beauty are in man's hands.

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TILLING AND CROPPING TECHNOLOGY

UDC 632.932.2

EFFECTIVE MEASURES OF PEST, DISEASE CONTROL ORGANIZED

Moscow ZASHCHITA RASTENIY in Russian No 8, Aug 86 pp 8-9

[Article by I. V. Babchuk, chief of the Administration of Plant Protection of the Ukrainian Scientific Production Association for Agrochemical Services to Agriculture, G. V. Grisenko, director of the Ukrainian Scientific Research Institute of Plant Protection, and N. S. Korniychuk, deputy director: "A Great Deal Depends on Organization"]

[Text] The intensification of agricultural production, improvement in the structure of sown areas, expansion of crops on reclaimed land and change in the system of soil tillage and in the technology of cultivation of grain crops have affected the specific composition of harmful organisms significantly. The danger of soil inhabiting and cryptocauline pests, as well as diseases, whose agents are capable of remaining in soil, or on plant residues, for a long time, or be transmitted by seeds, has increased. The unfavorable weather conditions in the Ukraine in the last few years have contributed to an increase in the population of cereal leaf beetles and shield bugs and to a spread of smut diseases and root rots.

Under these conditions the selection of methods and means of regulating the population of harmful species acquires a special role. With intensive technology agricultural engineering methods preventing epizootics and epiphytotics on wheat crops are put in the forefront. It has been established that, when winter wheat is cultivated on stubble predecessors during 2 or 3 years, root rots, fusarial wilt, bacteriosis and powdery mildew develop intensively and cereal leaf beetles, frit flies, cereal leaf roller moths and other pests multiply. The cultivation of wheat according to intensive technology, which envisages its placement after fallow and other well-fertilized predecessors and the application of a set of protective measures, makes it possible to avoid a severe affection and damage of crops.

However, a number of farms use fertilizers and pesticides without taking into consideration the phytosanitary state of crops and soil fertility, which leads to undesirable consequences, that is, increase in the harmfulness of pests and diseases and appearance of weedy vegetation species resistant to the applied herbicides. For example, an imbalanced and excessive application of nitrogen fertilizers intensifies the development of rust and root rots and during years with an insufficient moisture, of the condition of undersized ears as well.

Overstated pesticide rates pollute the environment, worsen the phytosanitary situation and often lead to a decrease in the harvest.

For the purpose of raising the standard of farming and improving the control over the observance of the technology of cultivation of agricultural crops, including winter wheat, many of the republic's farms have organized agronomist's offices, where the materials, visual aids, instruments and equipment necessary for specialists are concentrated. For example, in such a room there is a schematic map of intensive technology of winter wheat cultivation, which reflects the basic techniques and methods of cultivation of this crop and indicates the optimal and permissible periods of performance of operations, phases of plant development, during which the application of fertilizers and the treatment of crops with fungicides, insecticides and herbicides are advisable, and rates of consumption of chemical agents. Here one can familiarize oneself with the agricultural engineering map of every crop rotation field, by means of which constant control over the implementation of all agricultural engineering methods is exercised.

Organizational and methodological problems are solved jointly with specialists of the administration of plant protection and scientific research institutions. Support farms perfect all the elements of intensive technology. Associates at the Ukrainian Scientific Research Institute of Plant Protection and a number of oblast agricultural experimental stations (Ternopol, Ivano-Frankovsk, Nikolayev, Sumy and Cherkassy) have set up special experiments in an improvement in the protection of winter wheat with due regard for zonal characteristics and factors affecting the phytosanitary state of crops (standard of farming, varieties, soil fertility and so forth).

On the basis of fall and spring inspection data measures of winter wheat pest and disease control have been mapped out. In steppe regions this year we pay principal attention to the suppression of cereal leaf beetles, shield bugs, frit flies, aphids, powdery mildew and root rots and under irrigation conditions, of rust and septoria leaf spot; in the forest steppe zone and Polesye, to the suppression of grass flies, aphids, root rots, powdery mildew, rust and septoria leaf spot and to the prevention of the condition of empty and undersized ears; in the southern oblasts of the forest steppe, to the control of cereal leaf beetles.

A complication of the phytosanitary situation is often observed in regions, where recent years have been characterized by the shortage of moisture during the first half of the vegetation and by its excess during the subsequent period right up to grain ripening. Often this leads to the formation of unproductive shoots and the condition of undersized ears, intensive development of root rots and appearance of black germs, fusarial wilt and the condition of black ears. We use primarily the systemic preparations benlate, tilt and fundozol on such crops. The use of these highly effective fungicides is also necessary, because many farms in the Ukraine cultivate semidwarf and dwarf wheat varieties according to intensive technology. These varieties are noted for a high yield, but under unfavorable weather conditions are subject to affection by root rots, the condition of black and empty ears and fusarial wilt.

The application of bayleton, which has shown a high effectiveness (80 to 90 percent) during production tests on farms in Ivano-Frankovsk Oblast, is expanding in regions where powdery mildew and rust are spread. We use dialen and lontrel to control weeds that are difficult to eradicate and resistant to 2,4-D amine salt.

In the plan for an improvement in protective measures we envisage the study of the effectiveness of new insecticides, fungicides, retardants and herbicides and the possibility of their combined application for the purpose of reducing the number of treatments. We are introducing more effective methods of controlling harmful organisms, that is, a low-volume and ultra-low volume spraying of plants, application of insecticides in the form of granules during sowing and toxication and incrustation of seeds. We give preference to systemic preparations and edge, focal and band treatments of crops. We pay special attention to the organization of protective measures under irrigation conditions, where the harmfulness of soil inhabiting pests, root rots, powdery mildew and rust is intensifying.

We carefully prepare ourselves for every new season. We hold seminars in all the republic's oblasts and rayons, at which the characteristics of winter wheat cultivation according to intensive technology, including problems concerning the protection of crops against pests and diseases, are discussed. On kolkhozes and sovkhoses links are outfitted for the chemical protection of fields, equipment is repaired and adjusted and schedules of performance of operations are worked out.

Accurate Information--Reliable Forecast

A meeting of the plant protection section of the All-Russian Department of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin] was held at the North Caucasian Scientific Research Institute of Mountain and Piedmont Agriculture. Problems concerning the methods of collecting and processing data on the development of pests and diseases for a specification of the thresholds of harmfulness on field crops were examined at it.

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TILLING AND CROPPING TECHNOLOGY

DEVELOPMENT OF REGIONALLY ADAPTED CROPPING SYSTEMS

Moscow SELSKAYA ZHIZN in Russian 12 Sep 85 p 2

[Article by D. Vanin, Hero of Socialist Labor and director of the All-Union Scientific Research Institute of Farming and Protection of Soils Against Erosion: "Zonal Farming Systems -- A Means for Production Stability"/

[Text] Modern intensive farming, as is well known, is called upon to solve a threefold task -- to increase the production of food products and raw materials for industry in a stable manner with diminishing labor resources, to raise the fertility of soils and to protect the surrounding natural environment from damage. These then are precisely the aims of the zonal systems of farming.

Scientifically sound farming systems, as emphasized during a recent conference held in Tselinograd, constitute an important factor with regard to raising the productivity of land. However, the potential of these systems is still being utilized only weakly in many areas. The neglect of any one element of a farming system disrupts the entire cycle for harvesting crops and generally negates all labor and resource expenditures. We became convinced of this fact based upon a soil-protective system of farming developed by the All-Union Scientific Research Institute of Farming and Protection of Soils Against Erosion, in collaboration with a number of other institutes. The system was developed for regions characterized by water and water-wind erosion of soils. On those farms where use is made of the entire complex of this system, an increase is noted in the crop yields, expenditures per unit of product produced decline and there is a cessation of erosion processes out on the fields. For example, at the Kolkhoz imeni Lenin in Shpakovskiy Rayon in Stavropol Kray, the introduction of systems made it possible to raise the agricultural crop yields by 40 percent and surface runoff declined by a factor of 2-3 and soil erosion -- by a factor of 7-12. Similar results were obtained at the Zapovit Iliche Kolkhoz in Obukhovskiy Rayon in Kiev Oblast, at the Udarnik Sovkhoz in Lutuginskiy Rayon in Voroshilovgrad Oblast, at the kolkhozes imeni Lenin and imeni Gorkiy in Aksayskiy Rayon in Rostov Oblast and Krasnyy Oktyabr in Oboyanskiy Rayon in Kursk Oblast and at a number of other farms in the RSFSR and the Ukraine.

Unfortunately, on many farms this system is not being employed as an entire complex of measures but only in terms of individual fragments and thus it is not achieving the proper effect. This is largely due to the fact that the soil-protective anti-erosion measures are being planned and carried out by

various departments of the APK /agroindustrial complex/. And these plans are not being coordinated. Thus the kolkhozes and sovkhozes carry out the agrotechnical measures using mainly their own resources, enterprises of the State Committee for Forestry -- forest reclamation work, Minvodkhoz /Ministry of Land Reclamation and Water Resources/ -- builds water-retaining and water control embankments and terraces and carries out meadow reclamation work. As a result, it develops that forest plantings are created on one farm on still another -- simple earthen hydraulic engineering installations and on a third farm -- meadow reclamation work is carried out and on a fourth -- soil-protective agrotechnical measures. Tremendous resources are expended in the process and the return from them is small, since for all practical purposes the majority of farms still lacks complete soil-protective farming systems.

What is the reason for this status of affairs? There are many of them and yet it is our opinion that there are two principal reasons.

The first. The presently established economic mechanism does not stimulate the development, by the APK partners, of all elements of farming systems. Allow me to cite a specific example. Agrotechnical soil-protective measures are being employed with a great deal of enthusiasm at the Leninskaya Iskra Kolkhoz in Yadrinskiy Rayon in the Chuvash ASSR: afforestation work is being carried out in ravines, on steep slopes and along the shores of rivers, ponds and reservoirs. Eroded tracts are being reseeded, fascine and brushwood dikes are being erected on the bottoms of ravines, silt-collectors are being built and so forth. Certainly, this is providing a certain amount of assistance with regard to restraining the erosion processes and raising the agricultural crop yields. However, one kolkhoz acting alone is incapable of completely eliminating erosion. It must receive assistance from well equipped partners. Special embankment-terraces must be built and water-regulating forest strips planted. But the partners are not doing this. And quite often they fail to do this owing to the fact that the work volumes are too small for them. They desire large installations where they are able to work at the same place not just for a week or month but rather for years.

Work being carried out on installations which are small in terms of area is turning out to be unprofitable for subunits of Minvodkhoz or Goskomleskhoz, since the equipment and personnel must be dispersed and a need arises for frequent trips to be made and this tends to lower labor productivity and other indicators. But this is only from a departmental point of view. It is just the opposite from the state's point of view. Work carried out on an individual element basis and not from an all-round standpoint is unprofitable, since this is precisely the principal cause of a low return from invested resources.

Life persistently demands that the work of each department -- APK partner of kolkhozes and sovkhozes -- be evaluated according to the specific contribution made towards increasing the production of farming and livestock husbandry products. The time is obviously at hand for determining for each one of them the indicator for participation in obtaining the overall final result -- the quantity and quality of the agricultural products. At the present time, by employing only intermediate indicators which for the most part do not take into account departmental interests, we are not achieving proper interest by the APK departments in obtaining the best final result.

For example, let us take agricultural machine building. The amount of equipment being produced in this branch is not being coordinated with the quantities of agricultural products being produced throughout the country or with the resources needed for producing the spare parts required for replacing units and parts which break down prematurely. Actually, the lower the quality of the equipment being produced the greater the volumes of repair work. And this turns out to be profitable for those who produce such equipment and also for those charged with repairing it. It is unprofitable only for the kolkhozes and sovkhozes -- the direct producers of agricultural products.

Certainly, there is one solution here: the equipment repair work must be carried out by those who produce it. The system of paying for repair work must undergo very careful scrutiny. Payment should be made not for the volume of repair work carried out, but rather for the reliability of the machine and for its service life, with fulfillment of the plan for the production of farming products being taken into account. It bears mentioning that this same principle was employed by the MTS /machine and tractor stations/. The payment in kine for a unit of work carried out depended upon the yield level. The wage for machine operators was higher when the planned yield was obtained and if the yield was lower than that planned, then a corresponding reduction took place in the wages paid out. Among other APK partners, there is no close coordination with the production results.

The second reason for the slow development of zonal farming systems -- the absence in many republics, krais and oblasts of specialized subunits for the skilled carrying out of complicated soil-protective measures. Their complexity is based not only upon technological but also economic aspects. Meanwhile, anti-erosion work in some areas is carried out for whomever needs such work. An analysis which we carried out on the organization of work concerned with the development of soil-protective farming systems in our country and abroad makes it possible to select the most successful forms.

Thus, specialized teams should ideally be created at kolkhozes and sovkhozes for the carrying out of soil-protective agrotechnical work on arable and fodder lands and on slopes of not more than 12 degrees; detachments for creating protective plantings and for tending them have proven their worth at forestry farms; in the rayon associations of Selkhozkhimiya -- tracts for improving natural lands on slopes in excess of 12 degrees; for Meliorodstroy trusts -- tracts or mobile mechanized columns for the construction of water-retaining and water-draining embankments and also special terraces. All of these subunits must operate on the basis of a common plan and in a coordinated manner. Moreover, they must ensure that the farming systems at the farms where they work are developed completely and that the highest final results are achieved, as determined by the quantity and quality of the yield.

For further improvements in the farming systems and in their production development, it will be necessary to achieve a new quality level for the scientific studies and a stronger union between science and production. The farming science must first of all convert over to a new class: from a descriptive to a normative class capable of furnishing technologies which, under the specific conditions for their use, would serve to guarantee maximum possible yields for the kolkhozes and sovkhozes. Such technologies can be developed only

on the basis of joint work by the scientific and planning collectives. In this regard, we consider it advisable to create "Farming" scientific-planning associations at the republic, zonal and oblast (kray) levels. They can actually be organized at existing institutes.

In science, as is known, great importance is attached to the subjective factor and to the personal qualities of a scientist. A true scientist is absorbed in his work. All of the conditions required for creative work should be made available for such individuals and they should be encouraged. Improvements are needed in the system of wages for scientific workers. A considerable amount of work has been carried out in this regard. However, the existing wage forms do not take into account sufficiently the quantity and quality of the work. In any scientific collective there are situations in which the labor contribution by scientists possessing identical knowledge and degrees differs substantially and yet the pay is the same. This also applies to other categories of workers at scientific institutes. Hence, a time rate wage has already started to restrain the development of scientific-technical progress.

Work directed towards overcoming the use of a narrow-minded approach by APK departments in the area of farming production and also an improvement in the operational level of scientific collectives are making it possible to accelerate scientific-technical progress in the rural areas and to raise the effectiveness of agricultural production.

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TILLING AND CROPPING TECHNOLOGY

VASKHNIL MEETING ON INTENSIFICATION DISCUSSED

Moscow PRAVDA in Russian 31 Oct 85 p 3

/Article: "Raising the Return From Scientific Research"

/Text/ During a general meeting of members (academicians) and corresponding members of VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/, held in Moscow on 30 October, a thorough discussion took place on the contribution by agricultural scientists towards ensuring the intensive development of and improvements in the efficiency of all branches of the agricultural industry.

In a report delivered by the president of VASKhNIL Academician A.A. Nikonov entitled "On the Development and Implementation of Systems for Managing Agriculture Under Conditions of Production Intensification and Accelerated Scientific-Technical Progress" and in speeches by the scientists, it was noted that the modern stage in the development of agroindustrial production imposes raised requirements upon the agricultural science. The scientific institutes are under an obligation to accelerate the development of basically new methods for intensifying field crop husbandry and livestock husbandry operations and for actively introducing the results obtained into production. The work concerned with organizing the development of systems for the management of agriculture by regions is in need of substantial improvements. This work is being carried out slowly and does not encompass all regions of the country. Thus, of more than 70 oblasts, krays and autonomous republics in the Russian Federation, new methods for land management were recommended only in seven of them during the 11th Five-Year Plan. These systems were not developed for oblasts in the Ukraine, Belorussia or Uzbekistan.

Today the existing systems are not ensuring the required level of production intensity or production stability in the face of unfavorable weather conditions. Much of the work being carried out by scientific-research institutes in connection with agricultural management is descriptive in nature and quite often is restricted by technological recommendations. Such recommendations tend to lower the practical value of the work. Moreover, they are not always coordinated one with the other and they do not take into account the specifics concerned with the development of farming, livestock husbandry and feed production. The requirements for proportional and balanced development of the country's agroindustrial complex are not properly reflected.

Measures for raising the effectiveness of scientific research work and for eliminating the existing shortcomings are set forth in the decree adopted during the session.

A speech was delivered during the meeting by secretary to the CPSU Central Committee V.P. Nikonov.

The following participated in the work of the session: president of the USSR Academy of Sciences A.P. Aleksandrov, head of the Agriculture and Food Industry Department of the CPSU Central Committee V.A. Karlov and leaders of ministries and departments.

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FORESTRY AND TIMBER

TIMBER FREIGHT, RAIL TRANSPORT COORDINATION PROBLEMS AIRED

Moscow LESNAYA PROMYSHLENNOST in Russian 17 Sep 85 p 2

[Article from the dispatcher's office of GUDOK and LESNAYA PROMYSHLENNOST:
"No Return on an Advance"]

[Text] In August the enterprises of Minlesbumprom USSR failed to ship more than two million tons of production by rail to meet the plan. The basic reason is the usual, now chronic one--an acute shortage of empty cars. But the real question is: is efficient enough use being made in fact of the carriers in circulation?

In the documents from our dispatcher's office there has been talk on more than one occasion of the widespread need for zone-sized loading of timber. And we are in complete agreement with those who see in this method a realistic potential saving of loading resources. Common sense dictates that the more lumber you send per rail car the less total car space you will need.

But we recently received a letter with paradoxical implications about the negative effects of modern technology. A group of shippers from the Belorechenskaya station of the North Caucasus route react to our representations concerning zone-sized loading: "Maybe zone-sized loading works well somewhere, just that at our station it's been one big headache. The thing is that zone-loaded cars are not received at the Belorechenskaya-Veseloye checkpoint, nor all the way along the Transcaucasian route."

In fact, these checkpoints are stipulated as an exception in a series of standardized documents, even including manual No 301 for 1984. However, at many timber-loading facilities they have seemingly forgotten about this and continue to ship "twin-capped" half loads through Belorechenskaya. The letter provides a long list of stations similarly affected, located on the Krasnoyarsk, East Siberian, Gorkiy, Sverdlovsk, Kuybyshev and other railroad lines.

What happens next? "Naturally, we delay these rail cars," the letter says. "And we send telegrams to the shipping stations asking to advise how to handle the shipment. If a reply comes quickly--within three days--we reroute where indicated. In the absence of a reply, we remove the "caps" and reload into gondolas. This way one shipment arrives later in gondolas. Some receivers,

for example from Tuapse and Sochi, haul away the excess by vehicle. But in point of fact, in the majority of cases production delivery can only be done by rail. And while this "trans-shipment" takes place, the gondolas lie idle. And the savings from zone-sized loading are negated by the double loss at the unloading points."

And so, are these the costs of progress? No, it is not the advanced technology which is at fault, it is the curious "forgetfulness," or even carelessness of the associated enterprises of some stations. A clear-cut example of "out of sight, out of mind." The implications are evident. Rail car turnover is slowed down and, as a result, there is a shortage of available space.

Unfortunately, this is not the only way to be like the hunter who falls victim to his own boomerang. How can we overlook a simple truth: to have a full load tomorrow, you must without delay free up a loaded rail car today. Speaking figuratively, a loaded car delivered to an enterprise's spurline is an advance of sorts, given upon receipt of available space.

Of course, one needs to take into account that the timber must arrive at certain enterprises only in specific types and kinds of rolling stock, while the finished product is sent out in completely different types. For example, paper must not be shipped on flatcars, long logs not in boxcars, chips not in tank-cars. But on the whole, on-time unloading, or better yet, early unloading of rail cars creates a very large reserve of space. However, the attitude toward this reserve is less than enthusiastic.

For the first seven months of this year alone the enterprises of Minlesbumprom USSR have been assessed fines for excessive rail-car downtime while unloading (more than two hours) totalling 6,490,000 rubles. And losses of loading resources totalled 36,200 rail cars.

But these are, so to speak, averaged-off figures. They pale against the "achievements" of some enterprises. Without any doubt, first prize goes to the Bratsk sawmill. Here they have really learned with a flair how to saw themselves from a limb, and indeed together with the employers of the Bratsk division of the East Siberian Mainline.

This is not the first year that there has been talk of the rational utilization of rolling stock in the Bratsk sawmill association. How many resolutions have been adopted on this since the start of the five-year plan, how many reprimands issued, how many promises made! And as a result, rail-car downtime per loading operation has been more than double the allowable level since the start of the year. During this period more than 58,000 rail cars have been detained for unloading beyond deadline at the association's spurline. The fines have exceeded 32,000 rubles.

And yet the people from Bratsk would be hard-pressed to compete in this regard with their colleagues from the Ust-Ilimskiy sawmill or the Tyndales production association. There the fines for excess rail-car downtime end with five zeros

preceded by several figures. It must, however, not be forgotten that these teams work predominantly with MPS [Ministry of Railways] rail cars, demand for which is monitored very strictly. The Bratsk people have a fair number of their own or leased rail cars at their disposal. Their lengthy downtime periods are most often a matter of the owners' conscience. Moreover, the performance of this rolling stock is 30-40 percent lower than that of MPS rail cars.

The sources of the poorly organized loading procedures are to be found in the poor development of the enterprises' transportation management. In the Bratsk sawmill practically no funds have been earmarked for this purpose since the start of the five-year plan. And the balance of the estimated cost at the start of the year was 1,983,000 rubles....

The receiving unit for imported chips has not yet been commissioned, even though the deadline passed...back in the first quarter of 1981. Since then there has been fruitless talk of putting in a connecting spur from the stand of delimbed trees to the timber port, of a centralized electrical system for the shunts, and of upgrading track development at the Kombinatskaya station.

The employees of the Bratsk division of the East Siberian railroad are also making their contribution to excessive holdover of rolling stock. They stubbornly refuse to comply with the MPS order on circulating rail cars in the network of the timber-industry complex with a preliminary loading and unloading selection. As before, the system of joint around-the-clock load planning is also found wanting.

In a nutshell, there are quite a few holes in coordination of work between railroaders and loggers in Eastern Siberia. It is also evident that even the 250,000 rubles budgeted for the Bratsk sawmill this year to resolve their transportation problems is a drop in the bucket. Management of the complex may object that their relatively junior enterprise has more than enough problems besides transportation.

This is all true enough. However, one caveat: these very problems are also characteristic of long-standing enterprises. And these organizations do not take years to resolve them. That's the way unloading is done at the Astrakhan Pulp and Cardboard Combine, the Priozerskiy Pulp Mill and a host of other enterprises of Minlesbumprom USSR. Obviously, some colleagues have completely forgotten a simple rule of life: an advance in reserve demands a timely return.

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LAND RECLAMATION AND WATER MANAGEMENT

ACADEMICIAN ADDRESSES IMPORTANCE OF SOIL CONSERVATION

Moscow KOMSOMOLSKAYA PRAVDA 26 Dec 85 p 2

[Interview by L. Chernoshkur and D. Farodbekov: "In Debt to the Land: Discussion With V. A. Kovda, corresponding member, USSR Academy of Sciences, President of the All-Union Society of Soil Scientists, United Nations expert on environmental questions, USSR State Prize Winner"]

[Text] [Question] We are accustomed, when seated at the table, to put onto it a slice of black bread or a fluffy loaf of white bread. Without bread, a meal would not be a meal. We know that it is necessary to conserve bread, because every gram of it is produced by heavy labor. However, we often forget the chief source of our well-being -- the land.

Bread and the land are inseparable concepts. But the grain that has been sown will not spring up on every kind of soil. The Russian chernozem is our provider. It is no accident that a cubic meter of Voronezh chernozem is kept in Paris at the International Bureau of Weights and Measures as the standard of fertility. It is precisely the condition of our chernozems that determines the resolution of the Food Program. The draft of the new edition of the CPSU Program contains a statement concerning the need to coordinate the actions of vegetable husbandry with questions of protecting the environment. Why has this requirement become so urgent today?

[Answer] The question of protecting the environment has become exceptionally important today because, during the past half-century, there has been a gigantic increase in the influence that man has exerted upon nature. We have begun to interfere in its structure and functions, thus causing irreversible destruction.

[Question] Viktor Abramovich, some scientists feel even that this destruction in the biosphere is no less dangerous than a war. Is that an exaggeration?

[Answer] No, they are right. Poorly thought-out interference in nature leads to approximately the same result that war does, except that it is at slow rates. It is simply that the threat of war is tangible and understandable by everyone. But many people still perceive the threat of an ecological crisis as something abstract, that has been engendered by the scientists'

imagination. One could cite a large number of alarming facts and figures. But the thing that most troubles me as a specialist and scientist is the condition of our soils, and especially the chernozems. In our agriculture the return on capital investments has been decreasing from year to year. During the first postwar five-year plans, for every ruble that was invested in agriculture we received 20-30 rubles of additional output; in subsequent five-year plans, 10-15 rubles; but now we are receiving only 4-5 rubles. The present level of agriculture does not conform to our country's growing needs.

[Question] Some specialists feel that the potential of our soils is only one-half the potential in the United States. Do you agree with them?

[Answer] That is not true. The bioclimate may, indeed, be worse, because, after all, we are a northern country. But Russian fields are the homeland of the standard chernozem. We possess the greater part of the most fertile soils in the world. Of 300 million hectares of chernozem in the world, 190 million are located in our country. That is approximately 70 percent of the total plowland.

[Question] Why, then, haven't the funds invested in the land been yielding the desired return?

[Answer] Because we are incorrectly using the capabilities of our land. More than a hundred years ago the founder of soil science, Dokuchayev, called Russian chernozem the greatest force -- the giant on whom ancient Russia developed, grew, and became strong. But he also warned that that giant could overstrain himself. And that has already happened. It is just that many people, with disgraceful complacency, refuse to notice this. We soil scientists published the results of our research long ago. But people never used to pay any attention to them.

Unfortunately, today many of my associates and I note with alarm that the fertility of our soils has fallen by almost one-half.

[Question] Does that mean, then, that, however many efforts we apply or however large funds we invest, our land will not produce any more, so long as people take this attitude to it?

[Answer] In the 1990's the production of grain crops in our country is supposed to be one ton per person. The only way that that can be achieved is by increasing the harvest yield. But the harvest can be increased only by preserving and multiplying the force of the Russian chernozem and the other plowland. Who must do that? That is a question of no small importance. And it is very apropos that the question is being raised by KOMSOMOLSKAYA PRAVDA. Because it is precisely this newspaper's readers -- young grain-growers and those who tomorrow will go out onto the field as its owner -- are the ones who will renew and improve our land. I would like to give this example. The Komsomol members of Dnepropetrovsk Oblast thought up a way to stop the development of ravines, to reinforce their slopes. They are planting orchards in the ravines. That has a double advantage.

[Question] Figuratively speaking, from year to year we have taken out a tremendous loan from the land. But now the time has come to repay the loans without any delay. What must be done first of all?

[Question] Of course, soil reclamation. Reclamation, you will recall, is the improvement of the soil with the purpose of increasing its fertility. There are as many as 35 different types of reclamation.

Unfortunately, in our country there has been a strange distortion of the concept "reclamation." People have begun to understand by that term only the draining or the irrigation of the land. One can only guess how and why that happened.

For the chernozem steppes the replacement of the concept is by no means inoffensive. The simplified idea has led to simplified plans and actions, and, in the final analysis, to tremendous losses. For decades we invested tremendous amounts of money into the construction of irrigation and drainage canals, vainly expecting the promised harvest. In the practical situation it seemed that the expensive experiment of irrigating the chernozems had turned out negatively as a whole. Two-thirds of the reclaimed land has not been yielding the planned harvests.

We kept hearing people say, "It's the drought, it's the drought..." But what does that mean? If it has snowed or rained, but there is no moisture in the soil, that's not a drought. It is a low level of agriculture -- the people have not known how to accumulate and retain that moisture, because every oblast has farms where it would appear that there have been no problems with weather conditions, farms that get along well without any irrigation or subsidies. The people there know the meaning of snow retention, fallow land, and shallow non-moldboard cultivation of the chernozems.

But a low level of agriculture that has been replaced by irrigation is extremely expensive for the government. And we are speaking not only about the money that goes into the building of the canals. When people carry out careless irrigation of the chernozems, the structure of the soils is destroyed rapidly and the fertility is lost.

I repeat that what our land, especially the chernozems, needs is reclamation, but comprehensive reclamation. Irrigation is not mandatory everywhere. One must be cautious with it.

[Question] Viktor Abramovich, you just said "We're not just talking about money..." Actually, the problem pertains not only to the material aspect. The land is becoming poorer, and that, apparently, is causing the grain-grower to suffer also. The destruction of the environment proves to be, for society, not only a tremendous economic loss, but also a moral loss.

[Answer] You journalists have probably encountered more frequently situations such as this: a person is indifferent to the results of his labor, a young vegetable husbandryman has no responsibility to the land on which he lives and works, there is no high meaning in life. Where do these attitudes come from? We attempt to give him a material self-interest. But the moral problem cannot

be resolved by money. Indifference, the attitude that one is a disinterested observer, manifests itself wherever we say one thing but do something else. In principle everyone is in favor of taking a thrifty attitude toward the environment, but what have we done with it today?

[Question] Today we do, indeed, come sharply up against the contradiction: on the one hand, we cultivate the land in order to get good harvests, but on the other hand that cultivation contains the threat of soil erosion. At one time American scientist Bennett wrote a book about this, entitled "Plowman's Folly." The times are changing. At the present time we are doing a few things to protect the soils against erosion by water or wind. But the contradiction that we mentioned still exists. The Maltsev and Barayev system of antierosion agriculture helps resolve this. Why isn't that system being used broadly?

[Answer] Russian peasants have employed the non-moldboard system since time immemorial. The merit of Maltsev and other well-known vegetable husbandrymen lies in the fact that they have not forgotten the experience that has been accumulated over the centuries, but, rather, they employ it creatively on their own fields. Maltsev and I were in the Poltava area, where we visited the famous Morgun. There ought to be more people like him. Many people come to visit him and learn from him, but they are in no hurry to adopt the non-moldboard system. Why is that? The influencing factors are our inertia and traditions. So if people have become accustomed to deep plowing and to turning over a layer of earth each time, it is difficult to change over to another system of tilling the fields. In addition, there are not enough special machines: surface plows, flat plows, etc. But I must say that it is not mandatory for everyone to use the non-moldboard system. I shall not attempt to assert that this method is a universal one. It is more acceptable wherever there is a small amount of moisture and dust storms occur. Every farm must seek whatever is best suited to its land and its conditions.

[Question] But, Viktor Abramovich, nowadays there is only one thing that is required of a farm -- a harvest. At what cost is not important. There does not exist even a single planning indicator that the tiller of the soil could take into consideration for preserving the fertility of the land.

[Answer] That is apparently why we do not have enough good managers. I have in mind not a person who is thinking only about the fulfillment of today's plans at any price. We need managers who can look far ahead into the future and to work toward the long-term goal. During the course of a year, approximately half the kolkhoz chairmen and sovkhoz directors are replaced in our country. They have gone elsewhere to further their career or they have had a heart attack and left. It's just a revolving door. I'm an old Communist and I am speaking frankly. There is no material or psychological self-interestedness. Moreover, we have the problem of lack of education. What is the educational level among our specialists? Out on the periphery, young people at higher agricultural educational institutions are still using textbooks printed in the 1920's and 1930's.

[Question] Viktor Abramovich, let's just imagine an advanced farm, which has been producing grain from year to year at the rate of, say 40 quintals a

hectare. This farm is constantly among the advanced ones. But no one knows what is occurring with the fertility of its soil. I do not want to cast a shadow on the good farms. Not all of them exhaust the land in order to obtain good harvests, pumping the strength out of the soil without even returning any of it. However, how does one find out that this is not actually happening?

[Answer] You're right. If one is to wage the struggle for an increase in soil fertility, then it is necessary to begin with information, with reliable statistics -- without any figure-padding or false information. But today we do not have that reliable information. All the information is departmental, and therefore is unreliable. When a chairman reports to the rayon, the people there have a self-interestedness in the advanced farm, so they close their eyes to many things. That certainly is not being objective.

We scientists propose creating an independent, supradepartmental soil-protection service.

It is necessary to force people to work in agriculture not by eye, as is the general practice today, but on a strict scientific basis. For that purpose I feel that every farm must have its own small agrolaboratory.

Every farm must have a long-range plan for development -- for 10 to 15 years. It is necessary to learn how to look into the future and to be a good manager. But a good manager does not like it if he is given a lecture at every step. He needs control figures, but when it comes to achieving them, he should be allowed to think out how to do it and to find his own reserves.

[Question] Today one of those reserves is the industrial technological scheme for the growing of crops. How does this scheme influence soil fertility?

[Answer] Unfortunately, the industrial technological scheme does not always prove to be beneficial everywhere. We have an acute problem with heavy tractors, which, during the dry weather, convert the upper stratum of the chernozem into dust and, during the wet weather, press it down, compacting it like cement.

Frequently people use on the fields easily soluble mineral fertilizers, which are carried into the rivers with the irrigation or rain water. This not only causes the animals and fish to suffer, but also causes us to suffer. Also, organic fertilizers are not used everywhere.

So, whatever new technological system arrives on our fields, one must not forget that it is first of all a biological system, and only then a technological one.

There would seem to be an obvious truth that science first of all must be placed at the service of the protection of the environment. But, unfortunately, either no one asks for the opinions of the soil scientists, or people are interested in them only after they are confronted by the fact that the soil is diseased or dead.

[Question] But as early as the beginning of this century Timiryazev warned that there is nowhere else that the fascination with a one-sided point of view can lead to such large failures as in vegetable husbandry.

[Answer] That's true. And that stern warning is especially pertinent today. Here is a recent example: the construction of a canal for irrigating the south of the Ukraine with water from the Danube. We were not asked for our advice until after the canal had been built and the fact that the land was being ruined left no one in doubt. The water in the Danube takes on the waste products from all of Central and Western Europe. On the basis of its mineral composition, it is mineralized and alkaline. In addition, in order to convey the Danube water, for completely incomprehensible reasons, an absolutely unacceptable decision was made: allegedly for purposes of economy and reducing the total length, the main canal was laid through the solonchak estuaries close to the sea in Odessa Oblast. The water has proven to be saline. It cannot be used for irrigation purposes.

[Question] Even without this factor, with every passing year there has been a reduction in the amount of arable land per inhabitant. And that has been occurring not only in our country, but throughout the world. Certain Western scientists foresee that this will lead to a major food crisis on the planet. Viktor Abramovich, what do you think about this? What are your forecasts for the future?

[Answer] I'm an optimist. Naturally, with an increase in population and the expansion of the scope of construction, the amount of arable land per inhabitant is reduced. But in our country, I think, the problem is not so much a matter of the amount of land, as it is a matter of how we use it, what we take from the land. Today everyone realizes that it is necessary to improve planning and to carry out specific measures to preserve the soil and to increase the harvest yield. Everything depends upon each of us: the managers, scientists, grain-growers...

This depends, I repeat, upon each of us. But it depends primarily upon young people, upon those into whose hands we give the land as their inheritance.

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LAND RECLAMATION AND WATER MANAGEMENT

IMPLEMENTATION OF SOIL CONSERVATION INCENTIVES

Moscow SELSKAYA ZHIZN in Russian 7 Jan 86 p 2

[Article by V. Proshlyakov, candidate of economic sciences: "Take Care of the Land -- It is the Mother of Wealth"]

[Text] Modern kolkhozes and sovkhoses are large-scale agricultural enterprises, a complicated and multifaceted economic organism, all the links of which must function in a well coordinated manner -- both in time and in space. Moreover, these enterprises must be oriented not only toward today, but must also see their long-range prospect -- both the short-term and the more remote one. Therefore every farm needs a single document that would reflect all the production-economic and social problems of development by the individual years, for the immediate five-year plan, and by stages for the more remote period. It seems to us that the document that must become that kind of document is the comprehensive draft for the production-economic and social development of the kolkhoz (sovkhos).

In conformity with that comprehensive draft, the farm annually will carry out an approved plan for agricultural measures (operations carried out by the farm itself), and will also prepare (order) the planning-estimate documentation for the construction of projects in the next year, will conclude contracts with the contractors, formalize the orders for the deliveries of materials and tools, and plan and prepare other measures. Obviously, it was difficult to resolve the task of developing the comprehensive drafts for the development of agricultural enterprises under the conditions of the disconnected operation of the ministries and departments in the agroindustrial complex. At the present time, in the Gosagroprom system, the resolution of this task is being considerably facilitated.

With a consideration of what has been stated, it would be desirable to supplement paragraph 7 of Section VI of the draft of the Basic Directions for the Economic and Social Development of the USSR by the words: "...on the basis of the comprehensive drafts for the production-economic and social development of the kolkhoz (sovkhos), which are to be developed for each agricultural cooperative."

The development of the national economy as a whole and its individual branches, as is well known, occurs not only in time. Frequently, its

development requires considerable territories, sometimes including those that are being used productively in agriculture. Annually plowland, areas where vegetable crops are being grown, and other agricultural land is taken away to meet the needs of industry and transportation, and for other state and social needs. That land is taken out of agricultural circulation. In addition, on the farms themselves, plowland and other agricultural land is occupied by structures intended for civic, road, and other purposes, and is sometimes taken out of agricultural circulation as a consequence of being overgrown with bushes, swamping, the extensive growth of weeds, etc. As a result, it would seem to be necessary to assure that the state of the agricultural land is invariably taken into consideration when evaluating the production activity of the agricultural enterprises during the year or five-year plan. The plan for every kolkhoz or sovkhov must stipulate not only how much agricultural produce the farm must produce, and of what kind, but also how much land, and what kind, the farm must have at the end of the year or five-year plan. Because in agricultural production it is very important to know what each hectare will become, and what benefit will be obtained.

With a consideration of what has been stated, in our opinion it would be desirable to supplement Section VI of the Basic Directions with the following text: "Include in the national-economic plans of the union republics (and, consequently, the five-year and annual plans of all the land-users) indicators and measures that guarantee the preservation of a definite area of specific agricultural land and its definite qualitative condition."

In their practical activity, the kolkhozes and sovkhovs do not always display economic self-interestedness in the preservation and multiplication of the productive land areas. If, say, a particular area of agricultural land has been taken out of agricultural circulation, the question raised must concern not only the degree of responsibility for that, but also the responsibility for the economic damages resulting from the losses in harvesting the produce. That is why it is important invariably to implement the economic levers that have been stipulated in the Principles of Land Legislation -- such levers as the punishing of the land-users for a negligent attitude to the land, and the paying of incentives to them for carrying out measures to protect it, for increasing the fertility of the soils, and for bringing new areas into agricultural use. The ideas of the state or public inspectorate for the use and protection of the land can become the basis for taking the appropriate measures.

In this regard I consider it desirable to supplement Section VI of the draft of the Basic Directions by the following statement: "Evaluate the results of the production activity of the kolkhozes and sovkhovs with a consideration of the fulfillment of the plans for the preservation, restoration, and expansion of the plowland and other agricultural land."

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